

Aviation Week & Space Technology

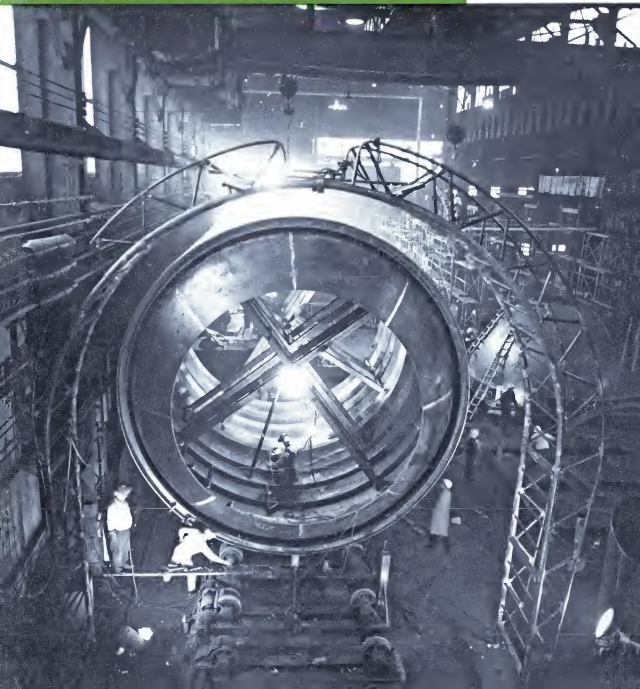
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January 28, 1963

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*The Atlantic Journal 3-19-75

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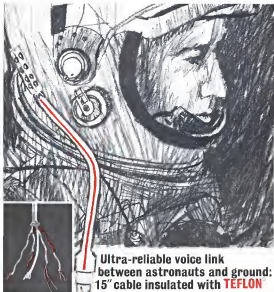
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AEROSPACE CALENDAR

Feb. 14—Symposium on Engineering for Major Spacecraft Programs, Georgia Institute of Technology, Atlanta, Ga.

Feb. 15—Advances in Manufacturing Symposium, American Society of Tool and Manufacturing Engineers, Park Station Hotel, New York, N. Y.

Feb. 15-19—Meeting, National Aerospace Standards Committee of the Aerospace Industries Assn., Ambassador Hotel, Los Angeles, Calif.

Feb. 15-18—Third International Symposium on Quantum Electronics, UNESCO Building, Paris, France. Sponsored by National Scientific Radio Union, Office of Naval Research, La Federation Nationale Des Industries Electroniques.

Feb. 15-18—Space Vehicle Thermal and Atmospheric Control Symposium, cosponsored by the Aeronautical Industries Division, Raytheon Club, Dayton, Ohio. Sponsored by AGO's Flight Accessories Laboratory.

Feb. 15-18—14th International Astronautical and Space Fair, Congress and Conventions, Thompson Park, San Paulo, Brazil. Sponsored by Space Systems Division, Frankfort.

Feb. 15-18—1963 International Satellite Control Conference, Philadelphia. Co-sponsored by Institute of Electrical and Electronic Engineers, University of Pennsylvania.

Feb. 21-23—Western Region Conference, American Society for Quality Control, Flamingo Hotel, Las Vegas, Nev.

Feb. 25-Mar. 1—19th Annual National Conference, Society of Fusion Engineers, Sheraton Hilton Hotel, Los Angeles, Calif.

(Continued on page 1)

AVIATION WEEK & Space Technology

January 29, 1963
Vol. 79, No. 4

The latest article with an up-to-date look at the future of the aerospace industry is "The Future of the Aerospace Industry," by J. R. H. Smith, Editor of the magazine. This article is a must-read for anyone interested in the future of the aerospace industry. It discusses the challenges facing the industry and the opportunities that lie ahead. The article is written in a clear, concise, and informative style, making it accessible to a wide range of readers. It is a valuable resource for anyone who wants to stay up-to-date on the latest developments in the aerospace industry.

The magazine also features a variety of other articles, including a feature on the latest developments in space technology. This feature is a must-read for anyone interested in the future of space exploration. It discusses the challenges facing space exploration and the opportunities that lie ahead. The feature is written in a clear, concise, and informative style, making it accessible to a wide range of readers. It is a valuable resource for anyone who wants to stay up-to-date on the latest developments in space technology.

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AEROSPACE CALENDAR

(Continued from page 5)

Mar. 15-26—Annual Hybridized Gas Turbine, Analysis and Space Meeting, American Society of Mechanical Engineers, 2200 Hillside Hotel, Los Angeles
Mar. 26-27—Die Film Symposium, Hollywood Thelander Inn, Hollywood, Calif. Space Information Inc.

Mar. 28-29—General Meeting, American Packaging News's Packaging Division, Bookers AFN, Air West Air Force Packaging Laboratory, 15000 Air Materiel Ave.
Mar. 28-29—Pumpkin Meeting, 1926 N. Ave., Cleveland, Ohio

Mar. 28-29—Electronic Propulsion Conference, American Rocket Society, Goodson Hotel, Columbia Space, Colo.
Mar. 29-30—Pacific Computer Conference, Institute of Electronic and Electrical Engineers, California Institute of Technology, Pasadena, Calif.

Mar. 29-30—Space Flight Testing Conference, American Rocket Society and Institute of the Aerospace Sciences, Green Book 9's

Mar. 29-31-1968 Western Metal Exposition and Congress, Fox Farley Auditorium and Ambassador Hotel, Los Angeles

Mar. 29-31—Spring National Convention Society for Nondestructive Testing, Ambassador Hotel, Los Angeles, Calif.

Mar. 29-31—General Air Force-sponsored Symposium on Space, Biltmore Hotel, Dayton, Ohio

Mar. 29-30—International Convention, Institute of Electrical and Electronics Engineers, Waldorf Astoria and Columbia, New York, N.Y.

Mar. 29-29-30—International Symposium on Electronic Beam Technology, Hotel Sheraton Plaza, Cambridge, Mass. Space School Electronics, Calif.

Apr. 1-8—Launch and Space Vehicle Shell Structures Conference, American Institute of Aeronautics and Astronautics El Mirador Hotel, Palo Alto, Calif.

Apr. 1-3—Eighty Annual Business Aircraft Safety Seminar, Flight Safety Foundation, Jefferson Plaza, New York, N.Y.

Apr. 24—Spring Conference, Airport Operation Council, Sheraton Hotel, Washington, D.C.

Apr. 29-31—Fourth Symposium on Engineering Aspects of Magneto-hydrodynamic, University of California, Berkeley

Apr. 16-18—Optical Mirror Symposium, General Engineering Center, New York, N.Y. Spencer Polytetrahedron Institute of Research, Institute of Electrical and Electronic Engineers, American Optical Society, Annual Services

Apr. 27-29—Annual Technical Meeting and Equipment Exposition, Institute of Environmental Sciences, Sheraton Hotel, Los Angeles, Calif.

Apr. 27-29—International Molecular Microscopy (INTERMOLECULAR) Institute of Electrical and Electronic Engineers, Sheraton Hotel, Washington

Apr. 27-29—Southwestern Conference and Electronic Show, Institute of Electrical and Electronic Engineers, Dallas Sheraton Auditorium, Dallas, Tex.

Apr. 27-29—Technical Meeting Nuclear Materials for Space Applications, American (Continued on page 9)



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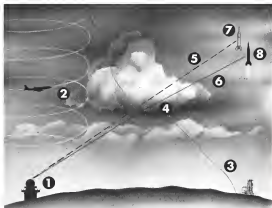
Dr. Irving Weissman, who is always in a hurry, walks up an up-going escalator at the rate of one step per second. Twenty steps bring him to the top. Next day he goes up at two steps per second, reaching the top in 12 steps. How many steps are there on the escalator?

(Continued)

The mounting of miniature components without soldering or welding is possible with a new line of miniature printed circuit connectors from our USMCO Division under the name "UNIAK". They provide for repeated interchanges of components without damage to lead, component, or connector. Get the facts on these gold-plated brass UNIAK connectors from U.S. Engineering Co., 15156 Ratway St., Van Nuys, California.

ANSWER TO LAST WEEK'S PROBLEM: The river flowed at 3 miles per hour.

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CRC microwave refractometer increases accuracy of radar tracking systems

...this is how: 1 tracking station 2 airborne microwave refractometer taking refractive index measurements 3 profile of the refractive index of the atmosphere 4 atmospheric data resulting from a marked change in refractive index 5 apparent radar beam 6 actual radar beam 7 apparent missile position 8 actual missile position, determined by correcting with refractometer readings, errors caused by the variations in propagation velocity.



The Colorado Research absolute microwave refractometer, accurate to $\pm 1N$ unit, is the only instrument able to provide the precision measurements required for this type of application.

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For complete specifications and application details, address Manager of Marketing, Colorado Research Company, Breckenridge, Colorado.



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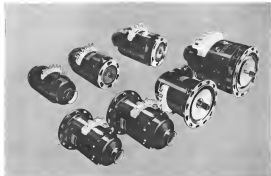


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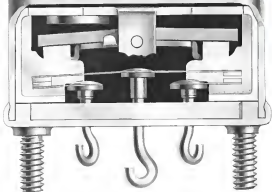
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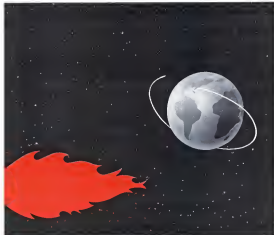
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View From Capitol Hill

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total congressional reaction to the postwar record aerospace budget for fiscal 1964 submitted earlier this month by President Kennedy (AW Jan. 21, pp. 25-31) indicates that it will face tough shelling at its tortuous progress through the legislative mill. The combination of the large federal budget and plans for major tax relief laws that will produce a record federal deficit is just too much for many conservative economists to swallow, regardless of political affiliation.

The federal budget will be cut. Space defense and space exploration share account for more than half of the total federal budget request, it is inevitable that they will be subject to some selective pruning.

The space budget will get its most critical look from Congress since National Aeronautics and Space Administration was organized in 1958. Ironically, while Congress will be looking at the \$16-billion NASA budget request to see where it can be pared without impeding the top priority Apollo lunar landing mission, it also will be scrutinizing the \$1.6-billion military space budget to determine whether it really should be increased. As has happened so often in the past few years, the shape of this debate will be heavily influenced by what the Russians do. We predict that before the fiscal 1964 space budget debate has run its course, another major Soviet manned space flight will have occurred to upset all current calculations as to how this race is running.

Keener Congressional Scrutiny

Congress has had an extremely sympathetic ear for space hard requests since Sputnik I. But this time it will take a much more realistic look at both the NASA and military space programs. The hearings of a subcommittee of the House space committee, headed by Rep. Joseph Keith (D-Minn.), on Cosmos last year provided Congress with a surprising view of the early NASA management pattern and led to some badly needed reforms in the vital program's management. The pattern of the Keith subcommittee's Cosmos inquiry should be repeated in several major provisions of the NASA empire during this session of Congress. In addition to the probe into the Apollo lunar orbital rendezvous decision (see p. 31) already planned by Rep. Otis Rye (D-Tex.) those will probably be an examination of the management of NASA's space research programs. Here the varied different records of the Jet Propulsion Laboratory and the Goddard Space Flight Center should merit keen analysis.

Many of NASA's management troubles are inevitable

in an organization that malfunctions at fast as the space agency has during the past two years. But this is a good year to take an analytical look at the way some of its key programs are working to meet their claims and verify expensive managerial techniques do not impede maximum progress toward the technical goals that have sold public and congressional support. In the past, the House space committee has carried the major burden of the inquiry, with the Senate committee remaining almost dormant. With the nomination of Sen. Clinton Anderson (D-N.M.) to chairmanship of the Senate committee, and his strong interest in southwestern research facilities, the picture may change.

Debate Factions

The debate over the defense budget will be led by two factions: the congressional conservatives, wing that aim primarily to reduce its size and the armed services committee leaders who will stress their personal past with Defense Secretary Robert McNamara over his policies. This will be an extremely hotly debated, particularly if it impinges on some of the military commitments of the Cosmos crisis. But it is unlikely to produce any major changes in the size or character of the defense budget. Mr. McNamara's congressional critics will be somewhat weakened in their offensive this year by the fact that most of what they want would cut far more additions to the defense budget—as veritable cuts in the current congressional fiscal assumptions. However, if the congressional inquisition are sufficiently helpful to do so. Mr. McNamara cut from the shelter of his previous statistical forecasts into open verbal combat on the military strategy and tactics prodded by his policies. The American taxpayers who are paying the defense bill might get some interesting clues as to their future.

Thus the congressional actions of the current session do not appear likely to produce any basic policy changes in the defense or space efforts. They are more likely to produce minor changes in funding, with the possibility of some across the board cuts made more for the political record than from a determination to make any significant program changes. The debate, however, will be lively. The ardent bureaucrats who fail to do their homework stand a good chance of being tripped by a somewhat more aroused and sophisticated Congress than they have faced in recent years. The aerospace industry must follow this Capitol Hill activity with perceptive diligence lest it fall into tactical pitfalls.

—Robert Elio



First Photo Shows A-3C Tactical-Reconnaissance Aircraft

Tactical reconnaissance version of Navy's Mach 2 A-3C (N3C). Vigilante is shown in flight. Aircraft is entering final underway, 400 ft dropable fuel tanks. These form a wing station, and also contain fuel and conventional bombs, ordnance and other external stores and equipment. The North American (left) is shown in a steep climb, and the aircraft is shown in a steep climb, and the aircraft is shown in a steep climb. Several dozen are expected around, out the tail of the plane. Fuel tanks contain ordnance and other reconnaissance equipment.

House Unit to Probe Rendezvous Choice

By Alfred P. Abner

Washington—House space committee is to conduct a thorough examination of the space agency's decision to accept the Apollo mission through lunar rendezvous. The committee will seek details of how the decision was reached and the extent of the opposition from those who favored earth orbit rendezvous.

Rep. Otis E. Torgue (D-Tex.), chair of the subcommittee on flight and space, indicated his concern about the cost of the decision to accept the Apollo mission through lunar rendezvous. He will seek details of how the decision was reached and the extent of the opposition from those who favored earth orbit rendezvous.

Rep. Paul L. Wiggins, of the Subcommittee on Space, also indicated his concern about the cost of the decision to accept the Apollo mission through lunar rendezvous. He will seek details of how the decision was reached and the extent of the opposition from those who favored earth orbit rendezvous.

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New Army Air Division to Make Key Test of Helicopter's Role

By George C. Wilson

Washington—Army's future mission role is being shaped in an Army Air Division now being formed to test the full-scale integration of helicopters into military combat operations for the first time.

Plans already approved by the Defense Dept. call for conducting the mission in a new Army Air Division, which will be formed to test the full-scale integration of helicopters into military combat operations for the first time.

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Some of the main questions the Air Division is expected to answer are:

• **Time mobility:** How fast and in what quantities can helicopters move troops, weapons, forces, becoming "second-to-last" in the world of the problems of supporting and maintaining helicopters to decrease their combat effectiveness?

• **Helicopter types:** Is it better to have smaller helicopters which can carry up to a squad of troops, or larger ones which can carry up to a platoon of troops, or even larger ones which can carry up to a company of troops?

• **Quantity:** How many helicopters are needed to support an infantry division and who should command them? One idea is to assign a few helicopters to each infantry division, and to assign a few more to the brigades that need them most.

• **Communication, navigation:** Will helicopters use troops to help, or will they get out of touch with other forces further than the front line? On this, too, will be a lot of discussion.

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Last September during President Kennedy's visit to the Marshall Space Flight Center, Wiesner was heard to say, "no good" during an Air Force explanation of how earth orbit rendezvous to the President (AW Sept. 17, p. 20).

When recent weeks, Wiesner says that the Soviet Union will use the earth orbit technique in its early manned flight effort have served the contractors over the two methods.

Torgue said he would like to find out more about the technical considerations that led to the lunar rendezvous decision and whether it was unanimous.

Members of the House panel on science and technology that met with the House space committee to discuss the lunar rendezvous decision and whether it was unanimous.

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British Skybolt Debate

London—British opposition Labor Party last week forced Prime Minister Harold Wilson into a full-scale debate on the Nassau talks agreement (AW Jan. 7, p. 20).

Conservative members of the House of Commons, led by Lord Hailsham, accused the British government of having entered into an "empty" commitment to joining the Nassau talks by the British government, which is to be held in Nassau, Bahamas, in the near future.

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XB-70A Work Slowed

Los Angeles—Work on the X-70A prototype has been slowed down by a lack of funds. The Air Force has been unable to provide the necessary funds to complete the project.

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Bid to Extend Three-Class Fare Opposed

Continental's report to CAB indicates passenger volume increase of 30% on Chicago-Los Angeles route.

By James R. Ashlock

New York—Continental Airlines' move to continue its three-class service through April 30 has stirred new controversy with its three main competitors, who argue means-end of the concept's effectiveness as a market stimulant.

Continental is a report filed with the Civil Aeronautics Board last week, viewed that its Chicago-Los Angeles passenger volume rose 30% during the first four months of the fiscal year, as the airline continues from each of its three fare levels. Revenues on the segment increased 15% the figures show.

Cases provided the report with figures that the airline's revenues increased 15% in the first four months of the fiscal year. The report also showed that business fare levels and the three other classes combined increased to greater percentage during the report year than traffic volume did for the same time period.

However, the three airlines who are competitors of Continental, who are the report's main opponents, argued that the report's data was not representative of the entire airline industry. They argued that the report's data was not representative of the entire airline industry.

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the passengers' means building an economic system, people with money build a system. People with money build a system.

Northwest Airlines, which is also a competitor of Continental, also argued that the report's data was not representative of the entire airline industry.

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Move by Northwest Would Stall Merger

Washington—Northwest Airlines last week asked the Civil Aeronautics Board to delay the merger between Northwest Airlines and the Western Airlines.

In its motion, Northwest said that it was not in a position to merge with Western Airlines until it had received approval from the Federal Aviation Commission.

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BAC 111 Operation Would Reverse Losses, Hawaiian Airlines Claims

By E. L. Doty

Washington—Hawaiian Airlines last week told the Civil Aeronautics Board that it was planning to operate the BAC 111-100 transport aircraft on the Honolulu-Kahala route.

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of the BAC 111 in 1959, less than that of the Convair 440, and 24% less than the Viscount 745. It added that the BAC 111 requires the use of only 57 of its 73 seats for the same passenger loads as the Viscount 745. It added that the BAC 111 requires the use of only 57 of its 73 seats for the same passenger loads as the Viscount 745.

Initial investment in the BAC 111 has been estimated at \$2,760,000 per airplane, plus differences for airport fees and customer modifications. It added that the BAC 111 requires the use of only 57 of its 73 seats for the same passenger loads as the Viscount 745.

Because BAC 111s to be flown by Hawaiian Airlines, Hawaiian Airlines said that it was planning to operate the BAC 111-100 transport aircraft on the Honolulu-Kahala route.

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SCAT-15 configuration, developed for study of supersonic transport design by NASA's Langley Research Center, features variable-sweep wings designed for Mach 3 cruise performance and stall speeds comparable to current jet transports.



SCAT-15 design, above, also a Langley development features three pusher jet engines and large negative dihedral on the horizontal tail. Variable-sweep wings are fully extended here—ready for the high-speed tests.



SCAT-17 is mounted for tests, without its downward all movable control surfaces, in the 40 by 40 ft. full-scale tunnel at Ames.

Latest Ames, Langley SST Configurations Tested

Final geometry delta-winged configuration for supersonic transport design is being developed by National Aeronautics and Space Administration's Ames Research Center. One of goals is to derive an optimum configuration for the candidate aircraft capable of cruise with high high-speed cruise and low speed landing operations. Under the general designation of SCAT-17 (Supersonic Commercial Transport), Ames researchers are testing a basic model (photo on this page and bottom of facing page) with possible variations in type, planform and shape of high lift devices and control surfaces.





UNITED ARAB AIRLINES' international routes are served by a fleet of six Lockheed Constellation 40Cs, which cost an estimated \$30 million. Airline has ordered a Constellation 40C for crew training purposes.

Egypt Seeks Long-Range Jets, U.S. Rights

By Robert H. Cook

Cairo, Egypt—United Arab Airlines' ambition to become a leading carrier both in Africa and the international field is being jeopardized by financial problems and political difficulties.

One of the airline's dilemmas is its inability to pay Egyptian Import Bank interest rates for the Boeing 707 long-range jetliner, reported to be, and the Egyptian government's failure to attain what it considers an equitable bilateral agreement that would allow it to serve New York.

Egyptians are convinced that the U.S. policy for aid to Egypt did not result in a granting of the airline's requests. Airline officials attribute this to " Zionist influence" in U.S. financial circles.

There is little doubt that UAA needs a long-range jetliner as it has increased its inadequate route mileage to more than 50,000 mi. less than three years. Most of this mileage is served in a fleet of six Lockheed Constellation 40Cs on a route system extending out to Tulum, Mexico, north into Europe and Rome and west across Africa to Accra, Ghana. In addition to a Cairo-London-New York route, the airline hopes to negotiate a South Atlantic route out of Cairo, Senegal, Cayenne and the Windward Islands can also be added to the UAA system.

While the airline credits the Constellation with many of its international successes, UAA concludes that the aircraft has a problem of poor load limitation on long-haul, nonstop flights. For example, on the 1,800 mi. flight between Cairo and Lagos, no more than 60 passengers can be carried because of fuel requirements.



FLIET OF FIVE Lockheed Constellation 40Cs is used on United Arab Airlines domestic routes and Middle East service. Expenditures of the company was valued at \$15 million in 1964 to enable purchase of the aircraft in 1956. Fleet of five DC6Bs was added the following year.



NEW CAIRO AIRPORT will be operational by October, this year. Administration building (left) and control tower (right) are under construction, including an EL2041 runway, is estimated at \$9.6 million. Two landing lights will be added.



Skyvan Prototype Makes First Flight

First flight of Short Brothers & Holmden Skyrvan 1 prototype (NW Jet 7, p. 41) was made Jan. 17 from Sydenham Airfield, Bellingham Island, with Denis Taylor, Short chief test pilot, at the controls. Prototype is powered by two Continental GTS90-530 piston engines. Skyrvan 1, the production version, will be fitted with two Turbomeca Astazou turboprops to boost payload weight to 6,500 lb. at speeds in excess of 200 mph. First flight was witnessed by Stuart Wynn, head of Wynn (India) Aircraft, and representatives of Trans Australia Airlines, both of which have shown considerable interest in the light transporter. Airplane also has been proposed to several air forces as a transport carrier. Aircraft can carry 15 persons, 12 horses or 3,000 lb. cargo.

It is also significant that UAA's most profitable routes are from Cairo to Rome, via Rome, Catania, Zurich and Frankfurt. Constellation load factors on these routes are exceeded only by the Cairo-Jeddah route, which carries the annual pilgrimage of Muslims to Mecca in Saudi Arabia.

Domestically, the airline's internal routes are served by five Lockheed Constellation 40Cs and five Douglas DC-1. Part of the Constellation fleet provides spare service to nearby ports in the Middle East and the combined piston and turboprop fleet serves only about 15 points within Egypt.

Even at a theoretical 100% load factor, few of these routes can meet bank's own costs because of the airline's, to change annually low fares, the airline says. As an example, the 25 mi. DC-1 flight between Cairo and Mena Matruh costs the passenger only \$7.50. The passenger, which owes 51% of UAA stock, absorbs these losses, which amounted to \$78,000, in 1961.

Regrains and operational costs of the Constellation fleet have also created a strain on the airline's finances. Although in 1961 operating revenues increased about 30%, the company was forced to transfer \$557,513 from a special reserve fund to offset its annual depreciation and amortization costs. UAA made a modest profit in 1962 and predicts that it will break even in 1963.

Consequently, UAA's domestic operation does not appear as vital to

Egypt's future as the one with more African routes. Fleet of Egypt's 73 million population is clustered around a narrow strip of the Nile, rarely covering 15 mi. in width, and no more than 15,000 of its total 400,000 sq. mi. is arable. Rail and highway systems are being expanded and recently began the construction of the Nile and the Mediterranean Sea corridor.

Touman holds the greatest promise of future profit for both the country and the airline, the Egyptian government feels, and extensive development plans are already under way. Several public relations contracts have been let to both U.S. and British firms, under which they are said to be studying the number of tourists attracted. Egypt hopes the tourist trade will eventually reach \$150 million annually, or twice the earnings that Egypt realizes from the Suez Canal.

Within the next three years the government anticipates it will be host to 300,000 Americans each year, and hopes to be attracting 100,000 British subjects per year by 1968. In 1962 42,500 U.S. tourists and 17,600 British tourists visited Egypt. Foreign income from each country is expected to reach an estimated \$18 million yearly. As part of this effort, Egypt is trying to reach agreements with many foreign airlines to conduct public relations campaigns aimed at increasing the flow of tourists to Egypt on their own route systems.

UAA's problem in financing long-range equipment could jeopardize its plans to become the dominant air power in the United Arab Republic, the company decided to retain the name United Arab Airlines in the hope that other Arab and African carriers might link their international routes to UAA under Egyptian leadership. The airline has already concluded several bilateral agreements, and is expected eventually to seek a transatlantic route between Tripoli and San Francisco. UAA has obtained entry rights into several British territories in Africa and Southeast Asia. It is expected to seek entry into Brazil and has already in several bilateral talks with the U.S. for entry into New York.

However, achievement of these goals would mean to little more than a diplomatic victory, without the equipment needed to serve such an extensive road system in the face of expected air competition from both European and African carriers.

Any Egyptian overture to bring the airline of Lufthansa, TWA or Alitalia—which it now serves—under the UAA banner would also require some degree of assurance that the combined operation would be profitable enough to justify participation.

Purchase of the Constellation UAA, an estimated \$30 million. The addition of five Boeing 707-320Bs, along with spare parts and ground facilities, would cost about \$16 million and



45 tons of cargo



or 188 passengers

The brilliant new Boeing 707-120C cargo jet offers operators the lowest ton-mile costs of any transport aircraft, existing or proposed.

The more important provides 3,032 cubic feet of cargo space. This latest configuration provides 4,728 more. The 720C can carry 45 tons of freight over a range of 3,580 miles. Cruise speed with full payload is 575 mph, providing fast and easy delivery of valuable cargo... across a continent, or across an ocean.

Conversion from air freighter to luxurious Boeing Intercontinental jetliner—or any cargo/passenger combination

—can be made quickly and easily to take maximum profit advantage of varying cargo and passenger traffic.

A development of the Boeing 707-320B turbulenter liner, reconfigured, the 720C incorporates the same major systems and components. Airlines realize substantial savings through standardized spare parts, ground handling equipment and training.

Boeing 707-120C jets, offering unmatched payload, speed and range capabilities, have already been ordered by American Airlines, Pan American World Airways and World Airways.

BOEING CARGO JET



New Presidential VC-137C Has Increased Range

Boeing VC-137C presidential transport for the President and other high government officials has a range of 7,000 stat. mi., an increase of 2,180 stat. mi. over the earlier VC-119A. New aircraft recently was delivered to USAF Special Air Mission squadron at the Pentagon, Air Transport Service. Cruising speed of the VC-137C is 580 mph, and it can operate from shorter runways than its predecessor. VC-137C is equipped with improved lightning radar and tele-type communications system.

propose long-term debt for jet aircraft to amount \$30 million. Its original capitalization 30 years ago was \$54,000 and now stands at \$17 million, but could require a heavy infusion if new jets are purchased.

UAA is strenuously opposed to the 777's increased cost, caused by the Leontyev-Berk for financing of the jet. If this revised bid agreement from the Agency for International Development to cover the one-third of the loan needed to finance general equipment and hangar. Because of this support, and Boeing's plan to build an extended line in Cairo, the airline finds that the Export-Import Bank should be willing to charge a much lower interest rate.

UAA has talked to Douglas about the DC-3 and British Aircraft Corp. regarding the VC-10, but maintains that the Boeing is still first choice.

However, the airline emphasizes that it can not wait too long and must decide to purchase the VC-10 or an alternative. BVC has not only offered a more advanced financing at lower interest rates, but has agreed to accept Egyptian pounds as payment and as a guarantee to provide better aircraft servicing facilities, UAA claims.

There are still two possibilities by which the airline might acquire the jets. One would be refinancing the order to only two aircraft, and the other would be an agreement similar to a BVC proposal under which final credit terms would be tied to a better agreement for the export of Egyptian cotton.

U. S. bilateral negotiations are now in Cairo concerning talks on UAA contracts into New York. Egypt originally sought San Francisco order as well as New York, but later agreed to limit its contracts to the North Atlantic.

Egypt was offered Trans World Airlines' present New York-Cairo routing through London and Paris, but rejected the offer on grounds that under the terms of the agreement, it should be granted, not just TWA's route, with all percent Egyptian stops but a southern route serving Madrid and Rome as well.

Refusal of the U. S. to grant Egypt's bilateral order, UAA contends, was done on the "policy" that the economic potential of an Atlantic route is lost through the traffic value of nothing Egypt can offer.

UAA contends that the real reason behind U. S. refusal of its request is a desire to protect the interests of TWA, which has been operating over

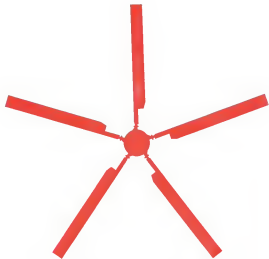
the routes for 16 years. The airline further argues that even if granted the routes, it would lack sufficient flight equipment to compete against TWA. Spain has granted UAA through and beyond traffic rights necessary for a transatlantic route, and while the Egyptian government could object against the U. S. by blocking TWA's at Cairo, UAA contends that such bilateral warfare is far outweighed by the more important problem of acquiring long range aircraft.

Indian Overhaul Plant

New 31,000,000 jet engine overhaul works was recently opened by Air India at Bombay's Santa Cruz airport in a new design to substantially reduce the airline's foreign overhaul expenditures as well as better the nation's technological potential.

Designed for complete overhaul and repair of the nation's 15,500 hours of Rolls-Royce Conquest that power Air India's Boeing 707-47 jet transports, the plant will overhaul four turbo engines per month in the next building stage, although it is designed to handle 12 per month if necessary. Present approved line between workload for the engine is 2,100 hrs. with extensions up to 2,600 hr.

Previously, Air India shipped its Conquest back to Rolls-Royce for overhaul at a cost of \$14,700 per engine. The air-transporter first domestic overhaul of the plant will save the company approximately \$751,000 per year in foreign exchange, a particularly critical item in the country's efforts to shore up its own economy.



Cost-cutters

With a helicopter, it's anomalous to cut costs, cut downtime. Sikorsky does. The new twin-engine S-64 is authorized 1,000 hours time between overhaul. That's long enough for it to make four trips around the world.

This economy is another aspect of Sikorsky's leadership in vertical flight. Through such proven performance—and continuing progress—Sikorsky is creating a new world of mobility.

Sikorsky Aircraft

DIVISION OF UNITED AIRCRAFT CORPORATION

STRATFORD, CONNECTICUT

UAC

Airline Traffic—November 1962

	Revenue Passenger Miles	Originating Passenger Miles	Revenue Passenger Miles	Revenue Passenger Miles	Total Revenue Passenger Miles	Average Load Factor	Scheduled Miles 0000	Performance Index (%)
DOMESTIC TRAFFIC								
American	15,120	479	41,120	34	46,717	4.4	12,342	96.3
Boeing	2,445	140	95,200	81	10,894	4.2	5,349	99.3
Continental	1,491	115	74,174	66	8,330	4.1	1,881	94.4
Delta	4,731	347	218,371	27	26,268	3.3	6,704	97.5
Eastern	8,115	444	203,174	68	10,991	4.4	5,140	99.8
McCarroll	3,478	123	161,346	47	15,888	4.2	2,429	97.0
Norfolk	1,334	188	47,200	21	4,933	3.7	1,266	93.8
Norfolk	3,127	144	151,341	46	12,489	4.2	1,266	99.1
Trans World	7,764	403	234,149	68	45,752	4.2	7,773	99.1
United	14,391	881	336,773	49	75,561	3.1	14,243	99.1
Western	2,061	174	51,113	48	5,993	4.4	2,709	99.1
Total	87,332	2,826	1,474,864	50	216,162	4.3	87,441	99.9
INTERNATIONAL								
American	100	5	8,415	47	2,117	4.5	—	—
Boeing	363	7	5,543	18	1,214	4.1	374	94.0
Continental	198	43	3,859	39	243	2.6	118	97.8
Delta	108	0	5,279	34	361	2.8	106	100.0
Eastern	773	36	48,274	41	5,415	4.1	777	99.7
McCarroll	88	7	8,615	48	213	2.8	20	99.8
Norfolk	403	16	45,134	40	2,113	4.0	271	99.4
Trans World	1,334	11	17,114	18	3,418	4.1	904	99.4
United	8,918	250	109,397	30	10,320	4.1	8,343	99.0
Western	267	14	16,213	40	89	4.3	16	100.0
Trans World	1,109	36	10,390	37	14,370	4.0	1,442	99.3
United	100	12	16,644	38	4,472	4.0	443	99.1
Western	100	6	8,241	41	84	7.5	127	100.0
International Total	16,363	478	326,696	41	124,849	4.0	16,136	99.9
LOCAL SERVICE								
American	175	22	17,452	53	1,124	4.0	845	97.4
Boeing	494	38	15,120	64	1,306	3.9	472	99.1
Continental	116	36	5,215	37	835	4.0	432	96.4
Delta	907	31	9,382	34	1,201	4.1	501	99.1
Eastern	259	37	6,210	40	667	3.9	315	97.7
McCarroll	910	93	10,048	47	1,545	4.1	820	99.7
Norfolk	1,173	84	16,101	39	1,433	4.4	1,077	99.3
Trans World	447	43	13,191	40	1,267	3.8	671	99.6
United	415	45	7,198	40	794	4.0	472	99.4
Western	849	38	13,104	41	1,407	3.7	514	99.4
Trans World	792	42	4,104	36	154	1.1	619	95.0
United	657	32	7,106	39	878	4.1	420	99.4
West Coast	544	28	4,170	27	730	3.3	507	97.8
Local Service Total	9,465	547	141,583	43	16,863	3.8	9,041	97.3
ALASKA & HAWAIIAN								
Alaska Airlines	331	0	1,700	30	3,359	7.3	117	94.4
Alaska Central	114	7	361	20	73	0.6	40	93.0
Alaska	145	0	3,826	30	287	1.4	131	94.4
Continental	49	1	176	26	39	0.8	26	93.0
McCarroll	316	10	4,719	29	243	2.3	243	97.9
United	17	1	21	14	4	0.2	4	96.4
Mr. Connelley	134	3	201	39	154	1.8	77	99.0
Pacific Northwest	331	8	7,415	14	1,204	4.3	324	93.9
Trans World	68	1	1,611	15	73	0.7	73	94.4
Western Alaska	19	1	18	37	0	0.0	16	97.9
West Alaska	264	2	794	20	177	1.3	173	99.1
Alaska & Hawaiian Total	1,739	30	23,914	24	8,186	3.4	1,904	98.9
FEEDBACKERS								
Chicago	20	2	95	37	10	0.4	7	97.0
Los Angeles	22	6	114	35	84	1.7	20	92.4
New York	43	10	214	40	41	1.0	40	97.3
Feedbackers Total	124	18	611	50	67	0.7	110	92.4
CARGO & OTHER								
American	73	1	201	47	180	1.4	91	99.3
Boeing	1,416	4	11,561	75	35,394	14.1	343	100.0
Flying Tiger	1,369	1	1,003	83	9,652	7.9	11	99.4
McCarroll	817	7	31,663	64	11,676	17.9	220	99.3
United	844	3	1,484	59	11,722	12.9	145	99.6
Cargo & Other Total	4,349	16	44,910	66	58,967	13.4	5,110	99.9
Industry Total	87,728	3,190	2,237,710	66	419,634	3.7	116,591	99.8

Isn't it time we had a one-class service on big jet aircraft?

There are many of us at United who have been in air transportation since its inception. We saw it introduce a standard of personal service that was unique in industry. But now we question whether a concept of transporting persons—rather than individuals—is not threatening to take over and blot out the human aspects of this business.

First and Second Class

We have a situation on our jet aircraft today that merits serious examination. Where we once had coach and first class on different airplanes, we now have them on the same plane.

Both classes enjoy the same speed, get there at the same time. Most first class passengers value and appreciate the extra service and space they enjoy, but some feel they pay too much for what they get. And in our opinion the coach passengers do not get enough in terms of sufficient space for comfort and for unimpeded movement on and off the aircraft.

Moreover, because the coach section takes the larger part of the plane, most of the people aboard are unavoidably given the feeling they are second class citizens.

A Confusion of Fares and Services

In an attempt to provide some sort of compromise, the airlines have lately been

introducing even more classes. There are now first class fares and "economy first class" fares; coach fares and "economy coach" fares, and lots more—each with its type of service.

The net result is a jumble that not only confuses the public, but also increases many handling costs. For example, the extra work, supplies and equipment required by multi-fares and multi-services cost United nearly \$5,000,000 annually.

How much better it would be to provide an improved, yet simplified, service that offers greater value to the passenger and at the same time reduces airline costs. This is exactly what we propose to do.

United Air Lines' New One-Class Service

Beginning on March 10th, United will provide one-class jet service between San Francisco and Chicago, and Chicago and Cleveland. Shortly thereafter, we will introduce one-class service between Cleveland and Newark, and San Francisco and Seattle.

We are altering the present configuration of some of our T20 Jet aircraft to provide a single class of comfortable three- and two-seating throughout the airplane, distributing space more equitably and making the aisle wider.

Along with this will go a single class of in-flight service, without frills, but with complementary beverages and tasteful meals, graciously served.

Those accustomed to coach will enjoy greater comfort, more spaciousness in terms of both seating and aisle, and some services they do not enjoy at present. Those who are accustomed to first class will lack nothing in the way of a good meal and the refreshment that now goes with it.

Because of the economies effected by a simplified, uniform service, this one-class jet travel—attractive to everyone—will be made available for only a few dollars more than present coach fares.

A Better Value for More People

The wonderful speed and ease of jet travel have immeasurably widened the horizons of our business, social and recreational lives. And jet transportation should be so considered as to give as many people as possible the best possible service at a price fair to all.

In furtherance of this aim we have filed a tariff with the Civil Aeronautics Board to offer these one-class flights between Chicago and San Francisco at only \$111. This is \$24.40 less than first class fare and

Fares mentioned above do not include tax

only \$5.55 more than coach. New tariffs, representing comparable values, have also been proposed for the other cities which will receive this service.

Reservations will be accepted now but no tickets will be sold before approval by the CAB.

It has always been our practice to stay close to those who fly with us, to talk with thousands of travelers everywhere, and to adapt our service to their needs. If you have occasion to use any of these flights, we will welcome your comments. Or if you have an opinion now, we would very much like to hear from you.

Your suggestions and support can help us bring about a more equitable and satisfactory standard of jet travel for all.



PRESIDENT

UNITED AIR LINES

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AIRLINE OBSERVER

Four carriers—American, Braniff, Eastern and Northwest—reported declines in revenue passenger miles for December compared with the same month last year. All 11 airlines showed a drop in December revenue passenger miles for the month, but only two carriers—Eastern and Northwest—failed to report a gain in each revenue passenger mile. Slight industry averages of 1.9% in total traffic for the month (AW Jan. 21, p. 38), contrasted to an 11% increase in December of last year, a not being interpreted as a sign that traffic gains are beginning to level off. Weather in the past two months has been a major factor in the decline, due to a traffic growth. Early estimates reveal that total carriers are anticipating a 4-5% traffic increase for 1963.

Load service airlines reported 1.6 billion revenue passenger miles in 1962, an increase of 10.6% over the volume handled in 1961. Load factor for the year was 42.9%, compared with a 41.6% load factor achieved in 1961.

Third level airlines are going faster to fight recent losses by load service airlines to return control of factor loss operations through the development and use of a low cost small jet program. Third level carriers last week formed the National and Third level airlines, with John L. Finkley of Trans Air Lines of New Orleans as its first president. Directors are Ross Miller, Trans Air Lines; Richard A. Brown, Eastern Airlines; Higinbotham, All; William Clements, Apollo Airlines; Thomas and Joseph C. Whitmore, Executive Airlines; Boston. All third level carriers have been invited for the opening membership meeting in Washington, Apr. 15.

Inclusion attacks on the proposed American-Eastern merger were renewed last week with the filing of briefs with the Civil Aeronautics Board on the merger case. Delta, the most ardent of merger opponents, led off the latest charges, warning that the merger would be a "one-month" step toward the eventual shrinking of the industry to "three or four super carriers."

Federal Aviation Agency will require all airline turbojet transports and all other civil aircraft flying instrument flight rules above 24,000 ft. to be equipped with distance measuring equipment after Jan. 30. Requirement will later be extended to all aircraft operating IFR, regardless of altitude, under the schedule beginning on Jan. 1, 1964, and will apply to aircraft operating on Jan. 1, 1964, and other aircraft having a maximum takeoff weight above 12,500 lb. on Jan. 1, 1965.

Current noise abatement restrictions requiring pilots to operate aircraft at or above a fixed angle of descent to the runway, should during a visual approach have been lifted by the FAA. Pilots will now be permitted to use their own judgment as to which point aircraft should drop below the slope angle to complete a safe landing. FAA and aircraft manufacturers have just published new when this descent would be made, so that noise abatement is not a consideration under the new plan. Rule will apply to aircraft equipped with visual glide slope indicator lights but not to those with ILS.

Revenue aircraft designs, Q48 R. Airlines, claims that the A-24 turbo-prop transport is expected to have a life of 10,000 flying hours, which means an A-24 can remain in service for 10-15 years.

Justice Dept. has reported that the number of claims pending against the federal government from aviation accidents reached a total of 930 at the end of 1962, compared with 82 claims pending on Jan. 1, 1961. Department said that about two-thirds of the pending claims arise out of 16 big aircraft disasters, and that there were a similar collision cases, over 100 lawsuits may be filed against both the airlines and the government.

Final report recommending a U. S. policy on international air transportation went to the White House last week. The report was to be presented to the President last Dec. 15, but disappeared within the interagency planning committee, which formulated the policy from studies conducted by private research firms, delayed the program. The critics argue will not be released to the public, but it will closely follow details of the first draft released by American West & South Transportation (Oct. 3, p. 28).

SHORTLINES

Algerian Airlines has signed bilateral air transport agreements with 14 nations including Soviet Union, United Arab Republic, Turkey, Romania, Yugoslavia, Czechoslovakia, Italy, France, Iran, Switzerland, Hungary, Syria and Iraq.

Air Transport Assn. has elected a Market Development Advisory Group of the Air Traffic Conference of America to develop means of breaking the so-called market. Seven top airline executives from transline and local service airlines will serve on the group.

Allegheny Airlines last week reported it carried 19% more passengers and handled 76% more cargo during 1962 than it did the previous year.

Alaska Airlines last week said it carried 44.5% of all international air passenger traffic in 1962 and expects to show a net profit of \$50,000 for the year, excluding federal subsidies.

Bonanza Air Lines earned 425-475 passengers in 1962, a 32% increase over the 106,040 carried in 1961.

Federal Aviation Agency has approved eight in place, two engine Beechcraft Queen Air 50 transports under a lease-purchase agreement for use in air traffic evaluation of air traffic control system and pilot proficiency checks.

International Air Transport Assn. will open a new technical house office for South America and the North Atlantic this week in Rio de Janeiro.

Pacific Air Lines has filed an application to provide helicopter service to the San Francisco Bay area and to the Oakland and San Francisco airports.

Pan American World Airways has filed a tariff with the Civil Aeronautics Board calling for the transportation of golfing equipment, at 150% of the fee baggage allowance at a cost of 36¢ in baggage allowance, Jan. 1, 1963.

Swedish Airlines System has received approval of International Air Transport Assn. members to operate Douglas DC-7C flights between the U. S. and the Scandinavian countries of Scandinavia since changed by the IATA earlier last week, the Icelandic airline (AW Jan. 14, p. 47). New laws will go into effect Oct. 1 if approved by the governments involved.



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SA-300	1500	"	30	40	30	400	
SA-118	2400	"	15	24	50	45.3	
SA-101	3400-3500	120	12.5	8	43	27.4	
SA-120	1000-1200	500	1.0	10	40	30	
SA-119	3000-3200	270	1.25	8	30	37.3	

For details on Sperry's broadband, high average power, phase linear, high pulse energy megawatt klystrons, write Section 115. Information about a wide selection of classified Sperry microwave tubes is available with proper security clearance and "need to know" (copy is represented by Cars & Co).

SPERRY ELECTRONIC TUBE DIVISION

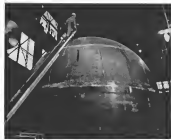
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Largest launch vehicle chamber manufactured in the U.S. is to be completed this week at Sun Shipbuilding & Dry Dock Co., Camden, N.J., under contract to the Armpit General Corp. Chamber has a 280-in. inside diameter, weighs 94 tons and is 80 ft. long. Armpit is completing the USAF long solid propellant motor contract (NSF Jan. 22 p. 37) and plans to use tank to develop handling, transportation and loading procedures. Photo shows three vehicle's 8th section in foreground, forward dome in background.

280-in.-dia. Rocket Case Constructed at Shipyard

Workers complete the first end to accommodate fuel and aft end closure for the Armpit test chamber. The chamber will be shipped by barge down the Intracoastal Waterway to Armpit's plant in Dale County, Fla., where it will be loaded with propellant.

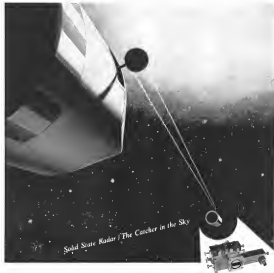


Steel is dropped over the aft end closure of the test case (left). The steel is used as the handling structure in manufacturing and transport. The steel plate closure (right) is positioned on the forward end of the chamber. A hole will be cut in the plate to insert the spiner. Armpit does not plan to store the test model.



Final section for the rocket test chamber, called the 8th case, is loaded for setting to the vehicle at right. Spiner beams are wanted for support and will be removed when the casing is loaded with propellant at the Florida plant.

Paraglider Test Problems Affect Gemini



A new solid state radar system built by STL engineers and scientists can send out and receive signals at X-band frequencies to help man reach out and reach back into space. STELSTRAC is its name. It is the first solid state system of its kind. The X-band transmitter is shown below. It has successfully proved temperature and vibration tests. STELSTRAC can also be used as a command link between vehicles in flight. By altering its mode design, the flexible radar system operates as an altimeter and Doppler velocity sensor to guide spacecraft safely in the surface of the moon and planets. Today STL is busy on many such projects as STELSTRAC. STL is also prime contractor for NASA's OGO and a new series of classified spacecraft for Air Force-ARPA. And STL continues Systems Management for the

Air Force's Atlas, Titan and Minuteman programs. These activities create immediate openings in Theoretical Physics • System Engineering • Radar Systems • Experimental Physics • Applied Mathematics • Space Communications • Astronautics and Mechanics • Instrument Guidance • Analog Computers • Solid State Physics • Computer Design • Telecommunications • Space Physics • Digital Computers • Guidance & Navigation • Electromechanical Devices • Engineering Mechanics • Aerodynamics • Propulsion Systems. For Southern California or Cape Canaveral positions, write Dr. R. C. Potter, Department A-1, One Space Park, Redlands South, California, or Box 4237, Patrick AFB, Florida. Your inquiry will receive a prompt reply. STL is an equal opportunity employer.



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Houston-Paraglider landing system development and production problems may further delay the first Gemini mission next year, only one mission has been scheduled to test drop tests of the system at Edwards, Calif.

Drop test program began last August and the only successful paraglider landing was made Oct. 23. The most recent failure occurred Jan. 6.

Drop test problems have largely centered around hot pressure secondary to National Aeronautics and Space Administration. North American Aviation's Space and Information Systems Division, recovery system prime contractor, and there had been some problems in the tests but considered them as inevitable part of any development.

Both NASA and North American agree that reliability of the paraglider concept has been demonstrated, and no critical test problems have been encountered in these tests.

First orbital flight presently is eight to nine months behind schedule, in case of landing, shogun (AV-14B, p. 35). If it appears that the paraglider will suffer delays, the program, NASA may decide to substitute a parachute landing system similar to that used in the Mariner program, at least in the first and possibly second flights. Parachute system is being tested in a backup and would be discarded when the paraglider is operational.

Two Capable Models

Two capable models have been dropped in five tests. Both models and their inflatable wings had been scaled down 14% in lower dimensions. Both capsules weighed about 250 lb, but one is inflated with air under 75 lb. for test purposes.

Heron capsule model, dropped in three of the five tests, had been aimed at the end of a 400 ft cable in an altitude of about 8,000 ft. by a Sikorski H-37 helicopter with paraglider wing inflated and deployed on the ground prior to takeoff. Purpose of these tests was to determine wind, velocity, and pressure attitudes of the capsule during combination.

Pull-in is a sensitive altitude which back velocity in the air, attitude and which parachute inflation. These paraglider tests were made Aug. 17, Aug. 23 and Oct. 23.

Lighter model had been dropped on two occasions, Dec. 10, 1962, and Jan. 5, 1963, from the H-37. On these drop tests the paraglider was stored within the inflatable neck of the test tank model as it would be, in operation. Ground reports: The model was covered through the H-37 in a horizontal drag and then dropped at

an altitude of about 12,000 ft. Purpose of these tests was to gather data on the deployment sequence of the wing and the dynamic loads of deployment.

On the first two test of the paraglider capsule and wing combination, last Aug. 17, the wing was not inflated correctly before planned altitude, was inflated and the Gemini model flew back to earth, suffering no major damage. Faulty operation probably was due to the fact that the parachute was not inflated.

Capable, and its wing was based on a two-high velocity and the combination started in flight up under the H-37 toward the rear. Two test runs were released, but at the helicopter forward and out at the capsule end. Model then descended to the ground, carrying the 400 ft cable from its nose. Free-swinging cable inflated a wall as the capsule as it descended the cable and the model was then in a horizontal drag and then dropped at an altitude of about 12,000 ft.

On the second test of the paraglider wing last Aug. 23, the wing was inflated at an altitude of about 12,000 ft. The paraglider, instead of the glide position, fell in the test pit. Airplane difference between the two altitudes is about 10 ft. in the wing setting, and about 25 ft. in the capsule's angle of incidence. As a result of this moment hitting the helicopter model dropped at about 45 ft. instead of the nominal 12 ft. Ground controllers finally dropped the model, emergency three parachute landing system through the main control radio but with the capsule. The model landed back, and several external balloons backed. The capsule was judged to be operable.

Drop test Oct. 23 was considered successful and no serious problems or problems as performance of the model were encountered.

The Dec. 10 drop test of the two missions to ensure actual deployment of the model paraglider from its stored position as the capsule's inflation neck—filled completely because of the wing capsule was being beneath the H-37.

NASA had directed North American to turn the model with the main drag in the direction of the helicopter to flight. This is the direction an operational Gemini spacecraft would be during actual in-orbiting the earth's atmosphere.

Carried about 100 ft. above and first the capsule model is a horizontal drag. When being along beneath a helicopter and leads to turn 90 deg. the flight path direction. North American decided that the instability was less severe so the model could return

end first. They along the model was not end, as evidenced by the fact that the lowest and attached state lines from the helicopter to the capsule. They met that after the harness line had been secured by a hook, the state line would hold just long enough before parting to dip the capsule out to the desired point and first attitude.

On the test, the capsule, tipped as expected but continued to flip and oscillate in a horizontal drag. The aircraft was in a state to deploy the paraglider. In the test, however, there was instability, not so great that the effort was not successful. Emergency parachutes were deployed and the capsule model received no serious damage.

On the most recent drop test, the wing's nylon fabric failed. NASA still is investigating this failure, but notes from the test that the test material was broken during the test. The failure of the three booms of the paraglider, was again caused with North American's and NASA's testing. It is possible that the point had a defect in the material and that the nylon consequently parted. Emergency parachutes again were used and were damaged, no expenditure in the course of a hard capsule landing. Nylon is being used only on the development model.

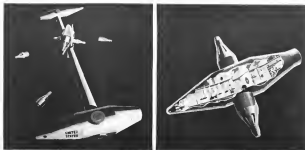
Parachute System

There have been eight drop tests of the Gemini capsule with the parachute backup system, beginning last May. 24 with a ball-balloon model. Four of these tests have deployed ball-balloon backup models and four ball-balloon backup models.

Ball-balloon, and measured test results are expected to compare and all test objectives are satisfactorily met. NASA, although having no doubt about the paraglider concept, would like to see this test as an alternative comparison, because of the fact that the parachute problem has been solved. Condition was selected to develop the balloon as a substitute to North American and this work was not to be present satisfactorily.

A parachute, instead of the ball-balloon, was in the end and down on the house.

Present planning concerns two in this qualitative test of the paraglider system, wind, flight-velocity, and no more Gemini capsules dropped from C-130s. Gemini flight plans are scheduled to practice landings in a test to ball-balloon which will resemble closely. One operation will be a modified ball-balloon model. Turner will be tested in altitude in helicopter.



PSEUDO-GRAVITY DUMBBELL CONFIGURATION station (left) shows terminal rendezvous sequence of trip. (right) shows with no material docking hub. Center view of two-guards configuration (right) depicts docking forms and internal arrangement. Approximate dimensions include a length of 70 ft and a 20-ft diameter at the endstations.

Pseudo-Gravity Space Station Proposed

By Warren C. Wetmore

New York—Concept of a manned dumbbell configuration space station, to be assembled in orbit in the 1967-69 period by multiple launches employing contemporary state-of-the-art launch technology, in conjunction with rendezvous techniques, was disclosed at the Institute of the Aerospace Sciences meeting here last week.

Joseph P. Stenski of General Electric Co. a Mission and Space Division presented the results of the nonpre-funded study of this engineering design of such a space station, which would be applied to Air Force's Manned Orbital Development Station (MDS) or to the National Aeronautics and Space Administration's Manned Orbital Space Station (MOS).

Possible station versions include:

- Planned training operations under zero and pseudo-gravity conditions.
- Microbiological and astronomical observations.
- Orbital launch platform for lunar and interplanetary missions.
- Logistic depot for repair, resupply and refueling of interplanetary space craft and vehicles.
- Research laboratory for space sciences.
- Communications and navigational station.
- Development station for space systems and techniques.
- Military launch development laboratory.

Key for only mission is reconnaissance and missile launching.

Mission design constraints—which were chosen purpose to reflect state-of-the-art launch system as if supported for a nonconcurrent period 200 years are general safety. Station modules are to be launched at an inclination of 30 deg. from Cape Canaveral, Fla., using Titan 3C or Saturn C-3 boosters, with Titan 2 as a backup launch vehicle for intercontinental ranges.

Logistics and personnel forms could be German or Apollo spacecraft with a minimum of adaptation for this mission, or a new vehicle could be created for this specific purpose.

Life support of the station would be more than one year, and the interplanetary crew complement at a time or more men, depending on the configuration of the station. First mission would be over land using a Koppelt-type parachute for a noncontaminated. Boeing-McDonnell/Apollo network would handle communications and tracking needs.

Selection of the type of station to be used was neither for comfortable study. One concept, suggested by General Dynamics Laboratories, Keith A. Elwood and others, involves the utilization of an upper booster stage as a space station.

This idea was discarded because of the problems associated with in-orbit conversion of the stage, in living quarters, in dining, in sleeping and in handling

the fuel tank, to prevent contamination, radiation and increased protection of crew and equipment, difficulty in supporting the tank with life support, environmental control and chemicals.

Large, self-erecting dumbbell pseudo-gravity station concept was rejected for reasons of engineering complexity, cost and weight, which would require a launch vehicle in the Saturn C-3 class. The latter consideration would push the operational date beyond the desired 1967-69 period.

Compromise solution between the above two approaches, known as "a giant outdoor vitamin station" was finally chosen. This concept permits maximum possible station volume—500 cu ft per crewman—measured with launch acceleration constraints, weight limits, repairs and maintainability of operational hardware in 1967 period.

In addition, the type of station could be operated as a single module for a micro-atmosphere, or two modules could be joined into a dumbbell configuration by means of rigid booms, thus permitting rotational pseudogravity.

Proven physical feature of this station is the use of counterrotation—no concept borrowed from marine engineering—which gives the system a minimum life span. The advantage is evident in this technique as in the assembly system (dumbbell launch) via checkout and mating to the booster. Counterrotation is a safety feature in

space, since compartments may be isolated in the event of meteoroid penetration or other emergency, such as fire or explosion.

Station compartments include laboratories in the forward station, living quarters and a ferry docking and resupply center in the center portion. The latter contains ferry docking ports, through which supplies may be unloaded from the logistic vehicles, and two airlocks for personnel transfer.

Spanning dumbbell configuration provides for a lock docking area in the connecting boom. For ease of docking, this boom, which could accommodate as many as eight flights, would be non-rotating.

Primary space station substation includes:

- **Life support.** Pressure of 7.0 psi was selected for the environmental air with oxygen as the prime constituent at its theoretical sea-level partial pressure. Nitrogen is used as the diluent. Carbon dioxide removal is effected by means of a recycling radiolysis filter, and the amount of water vapor in the air is controlled by condensation on the thermal control coils. Potable water is obtained as a by-product from the hydrogen-oxygen fuel cells, thus making the utilization of water from molecular water unnecessary. Nitrogen, hydrogen and oxygen are stored separately aboard the logistic terms.

- **Electrical power.** Fuel cells were chosen to supply the average station demand of 30 kw during the mission because of their simplicity, high efficiency and expected availability during the 1967-69 period. In addition, the cells and their fuels will be contained aboard the ferries, except for air consumption

system in the station, thus allowing launch weight savings of about 7,500 lb. Stored oxygen is used both for breathing and power. Microclimate, which enables the generation of isolated regions by hydropneumatics or chemical means necessary.

- **Thermal control.** Radiator system is used to maintain temperatures of the dumbbell end in the upper station. These devices are located on the booms and on the other sections of the station module. Use of alternate radiators, with coolant circulating to those with the most favorable orientation, makes the system independent of the station roll attitude in relation to the sun.

- **Attitude control.** Status of the second pseudo-gravity configuration led to the conclusion that a hot-gas system alone, powered by a hypergolic bi-propellant combination of nitrogen tetroxide and monomethylhydrazine (MMH), is inadequate for the strong station. Studies also showed that a combination of hot gas and thrusters, the latter to be located in the docking hub to keep it non-rotational, was desirable for the dumbbell configuration.

Maintenance of the interests of center station by locating as much mass as possible close to the center of rotation is deemed to induce propellant conservation. The rotating dumbbell pseudo-gravity station requires that the moment of inertia about the spin axis be equal to or greater than those about the other two axes. This means that placement of mass perpendicular to the plane of rotation is a critical factor, since the other moments of inertia are highly sensitive to this change.

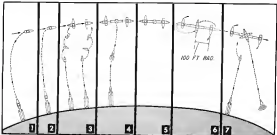
- **Communications system.** Tracking of the station would be accomplished by several means, including G-band laser transponder beacons, Minuteman beacons, and low frequency beacons, an L-band transponder beacon. Data link employs pulse code modulation, wide-band telemetry, with suitable sensors for input, as well as real time transmission. Other communications involve AM and FM voice transponders, radio facsimile, tele type and video.

Space environment hazards and the suggested means of protecting against them are:

- **Meteoroids.** Designated personnel penetration probability was set at one penetration per compartment each year. Protection of two aluminum bulkheads—pressure and structural—on the outer station wall, with each designed for its specific loading, increases the capability of the resulting configuration to limit pressure rise much further. Addition of thermal insulation, which has the effect of distributing the force of meteoroid impact, would lower the probability of penetration to one in two years for each compartment.

- **Radiation.** Gamma radiation hazard to crew members is posed by solar flares, but is a large extent, the proposed orbit would be shielded from these events by the tape generated by the earth's magnetic field. However, the near Van Allen belt occasionally is an altitude below that of the station orbit at a point over the South Atlantic, and this may require that the astronaut retreat behind some type of shielding whenever the orbit passes through this region of the radiation belt.

Any additional concern is the ab-



MISSION PROFILE of the pseudo-gravity space station shows launch of two station modules (1 and 2), launch and undocking of second module (3), arrival back launch and deployment of station (4), docking of station modules to central lock booms (5), undocking of supply vehicles, extension of booms and group-up of station (6), and orbital operation of the station in supply vehicle status to earth.

NAA, Subcontractor Apollo Funding

Los Angeles—Funding of the Apollo program for the principal contractors, North American Instrumentation and Information Systems Division, and its subcontractors will be between \$100 million and \$1 billion through the first manned orbiting flight only in 1965, Charles W. Fisk, chief of National Aeronautics and Space Administration's Apollo program office, said here recently.

Fisk would not assure the limits of this estimate, despite the fact that it involves a \$100-million span.

North American's original bid in the competition for the Apollo program was approximately \$500 million for a four-launch and return, a contract close to the program called *Apollo Work & Space Technology*.

As a result of increased complexity of the program and reduction of bids by NAA, North American's definitive bid, made late November, for the Apollo mission was approximately \$1425 million. This included the new lunar rendezvous approach using the lunar rendezvous module (LRM). But it did not include the cost of the ERM, which is the responsibility of Goddard Space Research Corp. under a separate \$100-million development contract.

Now negotiations have been conducted between NAA and North American to define specifically the scope of the work the company will perform to accomplish the manned orbiting flight with Apollo. These negotiations should be completed by May 15, and the figure should be below that submitted to North American by 10 or 15%, Fisk indicated.

This would be done through program review and elimination of some hardware and testing. Some risks would be involved, Fisk said, but these would not involve any danger to the manned portion of the program.

On the first lunar orbit, Fisk said, the moon's surface would be observed, so that perhaps a landing with LRM might be attempted on that flight. The extravehicular module might operate on the moon from four hours to one day, he said. This would be at the discretion of the mission.

made or modification of the proposed orbit would satisfy the geostationary orbiting effort, and consequently would entail an appreciable weight penalty through the necessary addition of physical shielding in the station.

Several possible logistics from earth-delta were considered in light of the possible crew rotation and storage in or adjacent to the station. The Gemini vehicle, currently under development as a medium-size vehicle appeared undesirable for supply of large stations because of the crew capacity of only two men and the limited cargo volume of the Gemini vehicle.

Apollo spacecraft, modified to carry five or six men, was considered a definite possibility. This approach would be an increased weight penalty for approximately six months during time of duty beyond the normal 10 days.

Relatively small payload-to-launch weight ratio and certain capacity of the X-20 Dyna Soar vehicle excluded it from consideration for long use.

Concept of the manned crewing vehicle—a sub-orbiting between the high-maneuverable Dyna Soar and highly maneuverable Apollo—appeared promising.

The vehicle would be designed to possess a hypersonic life-of-duty, which would give it a 500-mph or so lift maneuvering range and permit an air-to-air battle landing.

Vehicle weight about 14,000 lb., 50% of which would be externally carried stores, and could accommodate

four men or, with slight modification, three men and extra supplies.

Unmanned supply capsule appeared attractive for emergency and station supply between earth-orbiting flights. Vehicle could sustain an eight-hour fuel cell-powered station for 15 days. Thermal insulation and shielding phases would be research controlled by radio command from within the space station.

Apollo Boilerplate Test Program Cut

Houston, Tex.—Apollo command module boilerplate configuration program has been reduced from its original 13 test missions to four, according to some objectives can be achieved in comparison with other tests.

Early tests of the parabolic recovery system have already been performed. Ballisticized descent weights have demonstrated satisfactory strength. At the original test recovery procedures through full drops had specifications and no problems are foreseen regarding major design changes. NASA, however, will conduct an alternate recovery on orbital descent as a backup system.

Drop of command module boilerplate will be made in the first half of the year, including two tests using boilerplates from a Lockheed C-50B—two other Saturn missions will be simulated and evaluation would include simulated flight by human subjects under space conditions.

Demonstration of function and water-holding characteristics emphasizing methods of relieving the structural

problems from the water have been underway in Galveston Bay, Tex., under the aegis of Manned Spacecraft Center's Flight Operations Div., which is conducting tests and data exchange with North American.

NAA also will conduct land and water impact tests near its Downey, Calif., facility.

Flight test programs are scheduled to begin day tomorrow at White Sands, N. M. They are anticipated to last approximately 14 years, developing launch, short, escape and recovery systems utilizing the General Dynamics Convair 440 for 3 launch vehicles.

The program, which will utilize approximately four boilerplate and two prototype flight configurations spacecraft, will use some of the test programing techniques developed during earlier Mercury spacecraft trials with Little Joe 1.

None of the test spacecraft is command module.

While Simba experiments also will test some sophisticated guidance flight articles including the severe attitude propagation system to point its nose escape vehicle separation and mid-course correction vehicle.

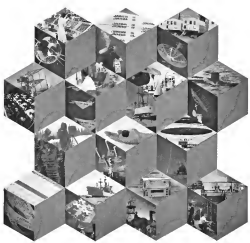
Flight program at Cape Canaveral, using Saturn vehicles, was intended to start late this year, with a boilerplate Apollo spacecraft riding atop SA-6, but it now appears that this vehicle launch will slip into 1964. Initial launch would use an uncrewed vehicle and provide confirmation of theoretical data on longitudinal and lateral vibration loads, heat transfer and other aspects of the system.

Saturn test program evaluations might prove successful. No permit flights are being considered, but some of the launches will carry data experiment relating to the overall Apollo program, such as a man-rated 4,000-lb. satellite (AW Jan 7, p. 26). Prior consideration in these experiments will be that they do not delay the lunar landing schedule.

Late this year a boilerplate will be delivered to Marshall Space Flight Center for wind tunnel testing to determine load values in various frequencies.

Two additional test vehicles will be delivered to North American of Downey late this year and during 1964. Non-hazardous testing of various systems including landing modules will be conducted. The first of these will be a breadboard configuration and the second would be a prototype flight configuration.

Another carefully complete spacecraft will be entered in vacuum chamber trials, fire at North American and then Marshall Space Center, where Saturn mission will be simulated and evaluation would include simulated flight by human subjects under space conditions.



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ELSSC—Extremely simple but accurate single target, single AME system for range display on the Atlantic Missile Range.

AGAVE—Primary capsule acquisition and fix Project Mercury.

ADAM—A highly sophisticated, three-target position tracking system based on combination of AME and DME.

ABCA—Digital data system for Atlantic Missile Range.

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Also, there's the question of terminating rack and panel connectors. Often confined quarters or complex wiring harnesses can tax the dexterity of even the most skilled worker.

To solve this problem, Amphenol engineers developed rack and panel connectors with Pole-Home® contacts. Pole-Home contacts make it possible to terminate conductors independent of the connector. Connectors can be crimped, soldered, or even welded to conductors, then inserted into the connector. Besides simplifying assembly, Pole-Home connectors can be easily removed after assembly should circuit changes or repairs later become necessary. Needless to say, Amphenol rack and panel connectors with Pole-Home contacts (Blue-Rib 17®, 93 and 94 Series, for example) are popular items with engineers who are faced with thick small spaces.

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There's a need for environmentally resistant rack and panel connectors, too. High performance seals, materials and space constraints led to the development of Amphenol 126 and 217 Series environmentally sealed rack and panel connectors. (The 217 offers the added feature of Pole-Home contacts.) Other Amphenol rack and panel connectors

can accommodate coaxial connections; many can be supplied with hermetically sealed contacts. There are rack-to-cable connectors available in every size. There are super-economy types and super-reliable types.

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Amphenol connectors shown on this opposite page are: 1—Blue-Rib 17 with (a) wire-type contacts and (b) solder-type contacts; 2—94 Series; 3—Micro-Ribbon; 4—126 Series Rectangular; 5—127 Series; 6—Blue Ribbon with (a) hermetic polecontacts, (b) pin polecontact and (c) hermetic shell and hermetic polecontacts; 7—126 Series; 8—217 Series; 9—126 Series Hermetic; 10—Circular Blue Ribbon.



FRUEHAUF CAPABILITY ADDS TO AMERICAN SPACE AGE MOBILITY

As a leading source for the designing, engineering and manufacture of military sub-systems, Fruehauf has added to America's space age mobility. On both prime and sub-contract, Fruehauf's resources have generated new savings and efficiency on a multitude of ground support and missile systems.

An outstanding example of Fruehauf participation in space age sub-systems, through the banner of its commercial and military divisions, is a recent project currently completed for Paul Hargensen, Inc., of Stanton, California, the prime contractor for the U. S. Air Force TITAN II Propellant Transfer System.

To achieve effective mobility, Fruehauf provided the essential equipment for moving the fuel and oxidizer holding tanks, the propellant conditioning system, the control system, as well as the waste disposal equipment. The concept of mobility fulfills the U.S. Air Force's technical requirements for maximum efficiency and illustrates its continuing program of cost reduction and savings to the Government.

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Defense Dept. Research and Development Money

(In millions of dollars)

	Program Cost (Fiscal Obligation) (Authority)	Program Cost (Fiscal Obligation) (Authority)	New Funds (New Fiscal) (Authority)	Contract Obligations (Fiscal Obligation) (Authority)	Spending (Spending)
	FY1960	FY1961	FY1962	FY1963	FY1964
Research, development, test, and evaluation—Total	6,347	7,327	7,000	6,400	7,000
Army	1,289	1,367	1,470	1,327	1,367
Navy	1,319	1,407	1,470	1,327	1,367
Air Force	3,740	4,553	4,160	3,746	4,266
Defense agencies	200	200	200	200	200
Military readiness—Total	617	756	779	731	814
Army	195	199	200	195	200
Navy	146	148	150	146	150
Air Force	127	134	129	119	124
Defense agencies	200	148	149	199	148
Grant—Total	457	744	699	607	607
Army	70	11	40	20	71
Navy	79	122	204	11	204
Air Force	308	611	455	576	432
Missile—Total	1,459	2,446	2,327	2,374	2,327
Army	311	420	277	369	443
Navy	484	726	289	444	567
Air Force	1,449	1,300	1,361	1,561	1,311
Ship—Total	149	317	394	117	228
Army	0	0	0	0	0
Navy	116	216	273	116	273
Air Force	0	0	0	0	0
Armament—Total	617	1,264	1,184	620	1,184
Army	100	31	20	88	31
Navy	30	37	40	16	40
Air Force	479	1,146	1,124	516	1,113
Defense agencies	0	0	0	0	0
Outcomes, vehicles and related equipment—Total	327	320	304	190	304
Army	126	147	175	108	175
Navy	87	16	129	74	129
Air Force	0	0	0	0	0
Other equipment—Total	617	756	779	731	814
Army	118	140	157	119	157
Navy	146	148	150	146	150
Air Force	353	468	472	466	507
Program-wide management and support—Total	410	410	410	410	410
Army	70	71	76	70	76
Navy	39	70	70	39	70
Air Force	210	269	264	271	264
Defense agencies	0	0	0	0	0
Emergency fund	100	100	100	100	100

Source: Defense Dept.

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Seventeen years ago, Martin entered the Aerospace Defense field with Matador, America's first operational missile. Today, the record shows that one-third of all U.S. missiles launched down the Atlantic Missile Range from Cape Canaveral were built by Martin.

Here are just a few examples of Martin's current overall capability, after 17 years of experience:

STRATEGIC WEAPONS. Titan I—land-based ICBM, operational in underground sites on schedule. Titan II—most powerful ICBM, storable propellants, near instantaneous reaction, also launched. Highly successful test program. Nearing operational readiness.

SPACE BOOSTERS. Titan II Geminal Launch Vehicle, Titan III Standard Space Launch System—over 2,500,000 pounds of thrust envisioned as the space "hughoboss" for the next decade.

SOLID PROPELLANT WEAPONRY. Pershing—fast erecting systems, built to fire almost instantly under rugged field conditions. Finest test record of any missile—37

complete successes in 44 launches. Bulbup—the nation's only supersonic air-to-surface missile, so reliable it is handled like a round of ammunition without pre-flight check-out. Lucresia—with pinpoint accuracy. All three on duty with Army, Navy, or Air Force.

HARDWARE ACTIVATION. Responsible for refurbishing Titans I and II—history's most difficult construction feat. Completed on schedule for Titan I. Progressing on schedule for Titan II.

RE-ENTRY BODY DEVELOPMENT. Specifically, Pershing—ablative nose cone which withstands rapid acceleration, deceleration and high re-entry heats.

NUCLEAR POWER SYSTEMS. SNAP generators for land, sea, and space systems—world's first in space, first on-orbit, first lighthouse, first weather station. Portable reactors at Sundance, Wyoming, and South Pole.

AIR DEFENSE AND COMMUNICATIONS. Missile Master and BIRDIE electronic air defense systems operational in 29 major metropolitan areas. RACOP communications system, providing direct-dialing, telephone type service for 700 simultaneous conversations on a single frequency channel without wire or central switchboard. Missile command and control systems, ASM systems.

MATERIAL DEVELOPMENT. Exotic materials, with high heat flux, high strength with low weight. First production techniques for fusion welding of high-strength aluminum alloy. Isopiastic fuel tanks, tubular fuel elements. Semiconductor materials research, microelectronic elements, cryogenics, ceramic heat shields, plastics, surface, ray-to-densim ionogels.

APPLIED RESEARCH. Advanced work in hypersonic aerodynamics, cryogenics, lasers, mirrors, celestial mechanics, guidance, quick reaction controls, stability, structures, millimeter wave theory, thin films, infrared detectors, computer technology, thermoelectricity, mission simulation, mathematics, checkout systems, advanced fabrication, solid state.

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AVIONICS

Arinc Tests Prove Auto-Checkout Value

By Philip J. Kline

Use of automatic checkout equipment during depot overhaul of avionics equipment significantly improves its performance in field use and cuts field maintenance costs, according to the results of a controlled test conducted by Arinc Research Corp. under Air Force Research Contract sponsorship.

These tests are the first to produce quantitative data which supports the earlier judgment that automatic test equipment is an advantage and provides evidence which shows its savings of man-hours. Results of the Arinc tests were reported at the National Symposium on Reliability and Quality Control in San Francisco last week by Philip J. Kline, in a report sponsored by Dwyer C. King.

Total of 140 sets of AN/ARC-27 ultra-high-frequency communications transmitters were used to compare automatic testing with manual testing. Because the ARC-27 is a relatively simple piece of avionics equipment and has been in service for about 10 years, field maintenance

technicians generally have developed higher manual test skills than can be expected for newer, more complex equipment. For this reason the use of automatic test equipment generally should offer even greater benefits than the ARC-27 test data indicates, Kline reported.

Here are a few of the data obtained during the Arinc Research Corp. tests:

- **Rejection rate of ARC-27s** prior to automatic test at the depot was less than half the rejection rate of sets which had been tested manually at the depot.
- **Misclassification before (MTBF)** for sets which had automatic test at the depot was 12% longer than for the sets which had been tested manually.
- **Parts replacement rate in the field** for automatically tested ARC-27s was less than half the replacement rate of manually tested sets.

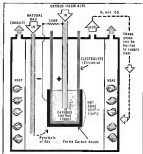
Arinc tests indicate that the use of automatic testing increases the cost of depot overhaul of the ARC-27 from \$337 to \$351, but this difference is quickly recovered in savings in field

maintenance costs. Over a 1,000 hr flight time period, field maintenance cost of the automatically tested ARC-27 was \$374 compared with \$354 for the manually tested equipment, Arinc data showed.

For the controlled tests, Arinc withdrew 140 ARC-27 transmitters from the stock of the Dallas Air Force Depot. These units had been overhauled, were fully tested and were ready for shipment to Air Force bases. Half of these units (70) were shipped to us at that time while the remaining 70 units later were partially returned at the depot for reprocessing with automatic equipment.

As the first step in this representative operation, the 70 remaining ARC-27s were tested for dynamic performance, using a Distco, Model DXT-801, made by Northrop-Sheridan Support Division. This test measured transmitter power output, receiver power output, receiver noise level, signal placement level and speech volume to preprogrammed levels.

All 70 units, regardless of whether they passed or failed this test, then were disassembled into major subassemblies



General Electric Fuel Cell Uses Natural Gas

New fuel cell developed by General Electric uses natural gas as other low-cost hydrocarbon fuels and also inherently has a conversion efficiency of 50%. Cell uses solid inorganic electrolyte, a cathode, anode and operates at temperatures of about 1,800°F without use of external heat. Drawing shows principle of operation. Gas enters at top left and produces when it reaches the hot zone of cell, forming hydrogen and carbon. Carbon deposits itself on outside of inorganic electrolyte to form anode. To supply necessary heat, hydrogen gas is burned within the cell. Exhausts carbon oxides as a solid electrolyte and contains a small amount of carbon oxides in which oxygen from the air is continuously dissolving. Oxygen gas enters out of anode after passing two electrodes such that electrons, which combine with carbon oxide to form carbon monoxide and release the electrons which are conducted out of the cell in electricity.

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which also were checked using Duxes. Additionally, all tubes were pulled and tested using a Fibertek Centronic tube tester, Model 1234, and the results of all power components were checked against acceptable limits using a Robotek, Model LA-303, made by Larson Laboratories. Any out-of-tolerance components discovered were replaced, and there were a sizable number of such replacements.

Thermistors then were assembled, aligned and adjusted manually, and again were tested for dynamic performance using the Duxes checkout equipment. The 10 amp tubes were shipped to the same or base to put up with the other 70 units which had been tested by conventional means procedures and shipped promptly.

Acme recognized that it is not fun to be the Air Force to ship resistance equipment back to an overhaul depot every time it malfunctioned in the field, instead of performing such maintenance at the base, except for line company systems such as control gearboxes. However, to provide another backstop for comparison, it was decided to do so for half the AEC-2's in that control test. Each of the two groups of 70 tube arrays was divided into two nearly equal subgroups. Whereas a substation occurred in one aspect in either group, it was reserved to the depot for maintenance with normal or automatic test, depending upon the original test procedure used. The other subgroup in each group remained at the base for report and service.

This provided the four following subgroups:

- (1) Depot automatic test, depot maintenance with automatic test
- (2) Depot automatic test, field maintenance with manual test
- (3) Depot manual test, depot maintenance with manual test
- (4) Depot manual test, field maintenance with manual test

Most significant data in terms of its applicability to Air Force's real life experiences comes from subgroups (2) and (4). It shows what gains can be achieved simply by introducing automatic test facilities at overhaul depots without any other change in control practices.

When the two groups of AEC-2's were received at Lockheed AFB, near Columbus, Ohio, they were bench-tested prior to installation on B-47 KC-97 aircraft, with interesting results. The group which had been pulled off the shelves of the depot having had only the normal manual checkout, nearly 75% were rejected for satisfactory performance. In the group which had undergone the additional automatic testing at the depot, the reject rate was only 7%.

Thermistors were operated until pilots reported a malfunction, then pulled

off and checked by base maintenance or returned to the Dayton depot, depend upon the agreement from which they came.

An analysis of most test between failures for subgroups (2) and (4)—the former with depot automatic test, the latter with depot manual test, both using base maintenance—showed that the automatic test sets had a MTBF of 24.6 hr, while the manual test sets had a MTBF of only 63.9 hr, a 53% greater time between failures for the automatic test sets.

Use of automatic testing at the depot during overhaul apparently catches many marginal components which otherwise would get through under manual testing and later cause field failures.

Subgroup (2) thermistors which had automatic test at the depot experienced a parts replacement rate of 7.7 per mil (one part per 10,000) hours during field tests, while manually tested sets had a replacement rate of 18.2 components per million hours, or more than twice the automatic test figure.

Automatic testing appears to shift the major part of component rejection away from the field to the depot where facilities are better provided generally, are better trained and more adequate stocks of replacement parts can be maintained. In view of the cost of handling and stocking spare parts at the base, there is an important potential saving.

Recent Acme tests confirmed the experience of other field reliability studies which indicate that components reported and rejected in malfunctioning does not show have a fault that can be located by maintenance personnel. (Continued on p. 75)



Weldable Substrate

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Approximate dimensions of this high temperature alloy of TD Nickel. The base support ring, the inside 10 inch diameter support ring and the 10 inch diameter support ring.

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stamped, and is resistant to corrosion and/or components may well benefit from the unique combination of properties available only in Du Pont TD Nickel.

Commercial Quantities Available. Commercial quantities of 1/4", 1/2" and 1" diameter bar stock TD Nickel are available. Steps, sheet forms and other products will be in production in the near future.

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DEUTSCH Sports HIGHLIGHTS

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to Editor
forma

Components like reliability into as advanced a function also out performance of each subpre- vention as to

Where space and weight economies are a requirement, the Deutsch submarine relay comes through with flying colors. And there's no worry about its failing in the hush of dry-circuit life are wanted

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Newest from competing under the Deutsch banner is a complete line of submarine electrical relays. In keeping with a company reputation for top performance in advanced

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(Continued from p. 70)
Somehow there is no being had, other times the unit is installed only to exhibit the same malfunction.

Aviac Research decided to keep on with its own, the assembly was automatically tested (ABC-25) performed after they had been removed, previously repaired and checked in base maintenance and re-installed on the aircraft.

The maintenance which originally had undergone extensive test with full maintenance at the base, 81.4% of the tests performed properly during the first flight after being scrambled in the aircraft. But only 71.8% of the tests which originally were normally tested, later conducted at the base, performed properly upon being returned to the aircraft.

Differences are even greater between segments (1) and (2) where both were returned to the depot for maintenance when failure occurred in the field, but with automatic test used on the former and manual test used on the latter segment. When returned and re-installed in the aircraft, 92.1% of the automatic test units functioned properly as the next mission while only 79.6% of the manual test units operated satisfactorily on the last mission.

Obviously considered that the available improvement of automatic test units over manual test sets was in part due to the fact that the former underwent two additional operational tests as well as subassembly tests and that the manual test units might exhibit better reliability if they had undergone several annual checkouts. The field test data indicates the latter is true.

Use of automatic test on the ABC-27 at the depot, in addition of the Aviac test, increases initial processing time increasing no longer are needed once annual test procedures from 270 min to 190 min. The increase results from the time required to disassemble and prepare the subassemblies for proper component take and dynamic tests. A



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total of more than 2,000 individual test results from 100 aircraft. The procedures are reinforced in the process. This quarter processing time, plus proper component replacement, as shown on how the assembly was automatically tested when automatic test is used—81.5% vs. 81.7%. But the resultant saving in field maintenance costs is \$560 per transaction per 1,000 lbs. of flight time, according to Aviac's figures.

Clearly and King concluded their report with an important note of caution: "It is increasingly apparent during the study that effective programming, as well as effective application of some basic testing equipment. The equipment to develop programming skills and techniques is even more urgent than the need for definition of requirements for automatic testing equipment and operational equipment. In fact, optimum hardware specifications can not be formulated until standardized programming techniques [are] developed."

One programming problem area is to determine which characteristics of each type of component are really important in the current function, which are most likely to change with time. Then program the computer to check these critical functions rather than attempting to check every possible parameter.

Another requirement is the need to determine acceptable failure rates after every upper and lower limits for equipment and component measurements. If limits are set extremely tight, the work load on maintenance and depot personnel is increased considerably, while if limits are set too low, reliability is the field will suffer.

Still another need is that various organizations which use automatic test equipment coordinate their philosophical approaches to programming to develop standardized procedures to develop the best available concepts.

FILTER CENTER

High Speed Microcircuits—Motorola

Products will soon introduce the first of a family of 10-pin ceramic made semiconductor logic microcircuits. Starting with a gate, the family will include a flip flop, half adder and arithmetic circuits, packaged in either TO-18 or then 14-pin square packages. The devices will be direct coupled, capable of operating at 0.5 volt at a few megacycles.

Threat to Mass-Parametric amplifiers, using gallium arsenide varactor diodes operating in a liquid helium bath, now are exhibiting low noise figures comparable to most computers, even over 100 db. The increase results from the time required to disassemble and prepare the subassemblies for proper component take and dynamic tests. A Lincoln Laboratory parametric amplifier model to 4.1K temperature, has indicated a noise temperature of less than 10K at 1,000 mc (10-hb) and frequencies of less than 10 g. (30-c)

Openly Available Bell Telephone Laboratories also is working in the new field. Lincoln Laboratory now is considering the use of such parametric amplifiers instead of vacuum cathodes placed in its new ultra-noise Harstad radar.

Electroacoustic Color Conversion—Fibers for converting the normal blue or green light emitted by electroacoustic phosphors into yellow, orange or red light in various shades with a high level of brightness, are being developed by a newly organized group in Navy Electronics Laboratory.

The group, entitled "A Color Conversion Technique for Electroacoustic Light," identified AD-278 747, is available for 71 cents from Office of Tech-

niel Services, Connector Dept., Washington 25, D. C.

Army to Buy Data Systems—Preliminary for an automatic engineering drawing storage and retrieval system for Army Military Command are due Jan. 15. New orders will be used to increase 200,000 existing cards per drawing plan before addresses which can be automatically retrieved.

Noise Source Calibration Available—National Bureau of Standards recently has introduced service for calibrating incoherent wideband noise sources at its Radio Standards Laboratory in Boulder, Colo. Service presently is offered in W199 noise level in frequencies of 9.8, 9.8 and 11.2 g. (June)

Lower Computer Effort: Financed—Ronne Air Development Center is seeking qualified sources for development of glass fiber lenses for use in optical digital data processing systems. Interested companies should contact RAIS, Gaffney AFB N. Y.

Search to Explicate Logo Words—Director of Soviet Radiophysics and Electronics Institute, Siberian Branch, Y. B. Brant, stated in recent interview that the institute's personnel are seeking "first priority" in quantum electronics, especially lasers.

Radical New Guide Available—Circuit this rule which shows rule selection design limits for varying dimensions in available, upon request, from General Controls Corp., P.O. Box 1000, Dept., 1600 South Main Street, Austin, Tex.

[illegible]

Rudder Malfunction Cited in 707 Crash

[illegible]

[†]The *Reading Chronicle* (March) published
Bar (11/11/1990) 1990: 25-26 and 27-28
54-55.



A typical departure flight path chart was prepared based on the correct normal operating procedures and the computer performance capabilities of the 707-330B. Based on a simulation of actual data, results of the control tower transcripts and flight recorder data for following sequence of events occurred during the flight of N 7308A:

BIG LQO[®] SPHERE BY PDM... BEST BUY BY AIRCO

The problem was economical storage of 37.5 million standard cubic feet of liquid oxygen at the Butler, Pa., plant of Air Radco Iron Sales Company. We're involved in about 5 lbs. pressure. Airco worked out complete performance specs. ■ The answer is the elevated sphere shown above built by Pittsburgh-Des Moines Steel Company. Inside diameter of the inner aluminum sphere is 44' 3". Height is 26' from bottom of inner skirt to ground. PDM designed every detail—design, engineering, fabrication, erection, climbing and testing. Airco had only to place the sphere in service. It passes down of other PDM oxygen vessels, both field erected and shop fabricated, which have delivered continuous trouble free performance since in operation—at minimum cost per unit volume stored. ■ PDM leads the way in solving specialized problems. For further information, phone, write or visit Pittsburgh-Des Moines Steel Company, North Island, Pittsburgh 25, Pa. *Circle 39 on Reader Service



Photo and Graphic: G. G. Grier

PITTSBURGH-DES MOINES STEEL COMPANY

top of the ball, during which time the leading clasp from 191 to 215 deg. At 190 deg. the leading legs collapse from the fully deployed position of the S&B and for the next 15 sec. indicate a much lower rate of leading change than that we actually recording entry into the denoised net.

The leading legs show a minimum extension of 100 in 190 deg. followed by a higher rate rate continuing until 195 deg. when a sharp reversal in the recorded heading is noted. Such an abrupt change, from a left turn to a right turn is beyond the aircraft's capability and is an indication of guided error in the developed part of the sphere in the style of left bank appeared 90 deg. From this time to about 198 deg. the recorded headings are steadily in error due to the high and well-predictable rate of error in an aircraft and due to the ground.

At 190 deg. 195 deg. 215 deg. and 230 deg. the recorded and alternate lines indicate sharp vertical motion, even more so than we read the aircraft's performance capability, and the highest gain recorded indicated, occurred at 230 deg. and 230 deg. at altitude at 190 deg. The precise calculation of these readings cannot be completely derived. However, a major error part for the left side of the forward fuselage is connected to the impact and alternate sensors of the flight recorder. As a result, the left side of the fuselage, from the side and high angle of attack, cause appropriate plus errors in the recorded impact and altitude.

The motion acceleration trace shows a rise from 1.0 to 1.5 g from 190 deg. to 195 deg. at which time an abrupt change is recorded as a minor reduction of both stall buffet indicator intensities and continuous out of impact. These from the same data and model of flight recorder data during Boeing Co. test flights is a 707-110B at pilot subsonic observation.

Immediately following the recorded peak impact and altitude, both parameters drop abruptly, and the recorded data reveals a subsequent reversal of 170 deg. at 198 deg. The rapid peaking and decrease in the impact and altitude traces indicate momentary velocity effects coupled with secondary drag resulting from prolonged heavy buffeting.

The sharp change of the impact, altitude and acceleration traces support the time of impact within 10 sec. As previously mentioned the impact time is verified at 190 deg. by the Facilities University semaphores.

An atomic sense of the maximum altitude of 21750 ft. was made in search of information which might have been, because an accident. This review was conducted at the facilities of both Airco Airlines and the Boeing Co. and, when deemed necessary, numerous and extensive personnel were interviewed.

The flight logs and the maintenance records of the aircraft were studied, and special attention was given to the critical systems. Research of major modifications published on the sphere was also conducted. Our analysis of engine maintenance records showed compliance with an American Airlines re-

pairing change order, an onboard ball track was accurately verified in the onboard ball track position of the sphere in both the right wing. No structural or mechanical work was required as a result of the completion of the engineering change order.

On the following flight the crew is proved difficulty with communication system, subsequent maintenance personnel adjusted the speed brake and spoiler control rods to correct the condition. After 175 mile round flight, during which no flight abnormalities were noted concerning the sphere, inspectors discovered the error. A correct modification and engine were then accomplished on Feb. 15, 1962, with no subsequent complaints concerning the sphere's position in the cockpit. Except for this instance, all records concerning the sphere were consistently maintained in an accurately condition in accordance with FAA-approved company policies and procedures.

All four parameters reflected extreme and erratic change characteristic of a high velocity, moderate impact of the aircraft. The extent of lateral change in the forward fuselage, that such an operating approximately 5000 gpm, which is equal to 10 ft. per sec., at time of impact. Although detailed examination was performed as a result of the disturbed region, no cause for flight danger or failure could be found.

The error made by the sphere in the bottom of the bar was approximately 110 ft. long and 2 to 10 ft. deep. The impact stage was impacted and the two legs crossed vertically, leading into wing section. Part of the horizontal structure and altitude track top of the leading is stuck into the largest part of structure reversed.

The fact, which caused the aircraft to be, heavily damaged the aircraft's system at the impact structure, impact and for damage was so extensive as to provide momentary loss of communication of the aircraft which might possibly have added important information. No evidence could be found to indicate that there had been an impact, but an extreme vertical impact, in vertical impact.

The cockpit area reflected the most extreme implications of the error incident, the degree of longitudinal stability, decreasing several feet of the aircraft. The horizontal stability, however, was 15 ft. per second, or 1700, with the tail cone intact and not attached. The actual velocity was not of an extended vertical impact at 15 ft. per sec. and 15 ft. per sec.

The leading legs were determined to be in the fully extended position. There was no indication of defective track in any of the four legs, and the time, in order of a few minutes, in any of the four legs.

The data and most of the remaining test data of the four legs showed some degree of damage. Examination revealed no damage to the four legs, but in the fully extended position.

Reconstruction of the wreckage was made in a longer, detailed study, in order to determine as possible was made



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Guidance and Control Systems Division

of the lateral control system, considering the roadway damage it had sustained. If the right control cables on the right wing, only the right wing down from outside movement and all others were in place (C). On the right cable on the left wing, all were in place except for the bus cable A188 which was missing from TFS (wing station) 400 outward.

In the right wing, most of the subcordiformis was bled out; the outboard subcordiformis was complete to the left wing; the subcordiformis was fairly well intact despite laceration by damage. The subcordiformis was extensively damaged by the impact and the left subcordiformis mechanism of the right wing was determined to be in the locked and protruded. Vagor points of the left wing inboard mechanism were not measured, but the anterior wire was found extended to the locked-out position.

Impact Statement

[illegible]

A run-down inspection of the eight spoiler activators and four spoiler control valves revealed that these components were capable of normal operation prior to impact. Nozzle damage to the lateral control system due to impact and fire precluded the examination of some manual parts. Both cockpit control wheels were determined to be slightly beyond the position for a full right nose down control command.

Extension of the horizontal stabilizer revealed no evidence of any inflation. Measurement of the position of the net on the stabilizer (unknown) corresponded to a cockpit indication of 2.5 mm nose UP trim.

On August the vertical line on its right side from the fire-lug, located on its right side in the area of the most intense fire, and the rubber and felt were almost completely destroyed by fire. The upper portion of the central cylinder was severely damaged by impact and fire but the annular portion of the cylinder was not damaged and was not fused with the upper portion of the cylinder. The latter was partially consumed or melted but was still attached to structure, all cables and fittings were in place since to the Q and had not melted, while the cable had melted very severely. The cable was severely damaged, but the cable still came out with 100 braids and braid not melted, was fused in a mass of molten metal. Thus, even, it was impossible, to disintegrate the remaining portion of the central cylinder. Heat of the fire was not sufficient to destroy the cable and attaching to the cylinder destroyed under wet property, melted

isolated. No other part of this rod or any portion of the attaching tube between, sub-control rod or reflux quadrant control rod, could be found.

The rubber control (compound) bell crank was found with all of the rod ends properly attached. The rubber from tension rod was in place with no apparent pickup up into the sleeve, and thus disappeared as a result of impact deformation. The hose drain and pump were recovered and appeared to be in normal condition. The rubber cushioning spring mechanism showed no evidence of rubber churning out of the pulley groove.

Want to know more? Search

After review of all the above evidence to a larger, the accident site was conducted with hand rules. U S Army personnel with mine detecting equipment later assessed the search to wreckage. Because of adverse weather conditions and some health high risk, recovery of the wreck was not difficult and thus:

A hydraulic dredge was employed to recover paper believed to be interbedded in the work. This operation was conducted for a period of three to four weeks, during which time numerous papers of varying age were recovered. The search was continued using a cone with three-sided digging equipment, resulting in recovery of additional wreckage. Some of the wreckage recovered was in the form of metal masses embedded after being melted. These were pure X-15, unburned and in some cases chipped from the aircraft.

Examination of the replace components

Some equipment-related frequencies, such as those in the extended equipment spectrum for the period of fault is given.

The electrical system was checked for any indication of an electrical cause for the flight or the malfunction or failure of any system due to electrical faults. Although the thoroughness of the check was not such as to rule out the possibility of a shorted or grounded wire, no evidence was found to indicate that an electrical system or electrical test caused or contributed to the crash prior to impact. Numerous indications obtained from the wreckage disclosed that electrical energy was present in most

The hydraulic system, also damaged in the shifted container that it was opening, could not be repaired. The pressure was lost because of the oil-filled and not-leak-proof nature of the right wing, which requires both static and dynamic systems to operate properly, a situation not uncommon. The total consumption of the fuel of the aircraft makes the hydraulic pressure gap, located in the first officer's instrument panel, a critical an indicator of the fuel at 1500 psi. The primary transmitter, which controls the main checked control, was tested.

The rubbery hydrogels prepared variously, electrostatically grafted, are determined to be in the electrically decomposed at 5000 psi, positive normal for isoprene latex 245 k. The electrically grafted rubbery grafted, stiff rubbers, are also determined to be in the pressure GN, electrically decomposed portion. When decomposed it was found that the rubbery grafted has partially peeled or flaked away when bath of these rubbers. However, subsequent to

by having indicated that any model particles thus released into the system would not adversely affect the operation of the rubber band and due to a filter at the bottom of the column.

the safety of the damage assessment, was exposed to a roller pressure of 175 kg/LIFT. The piston of the hydraulic ram acted on the roller, which controlled the movement of the roller. The roller was not rotated; it was only moved up and down. The RCHT index (1) can be taken as the ratio of the roller pressure to the roller weight. The force of the ground has a small net load to produce no change in the position. The roller moves when it can be produced by the force of the piston pressure. The roller pressure of 175 kg/LIFT is the maximum roller pressure that can be produced by the piston pressure. The roller pressure of 175 kg/LIFT is the maximum roller pressure that can be produced by the piston pressure. The roller pressure of 175 kg/LIFT is the maximum roller pressure that can be produced by the piston pressure.

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The interdigital cleavage works on the top and first bottom's central which may lead with the bottom in a deeper position toward central tunnel. A new study was conducted to determine the significance of this finding. Fluorescence revealed that both springing bottom phlegm lead third completely through the bottom of the work. Normal operating pressure on the cleavage bottom is 1 to 2 lb. This showed that a load of about 90 lb. is required for the phlegm to lead through the bottom, a load of

void the physical rigidity of a policy.
 should in practice acknowledge that most
 of the funds raised would be applied to
 the switch plate rather than to the bottom.

No more on the top of ribbed pipes before were found to indicate fire had been struck, to hinder investigation during impact. Tests prior to disassembly of the vehicle and road examination afterwards showed that the electrical conductors were open in both vehicles corresponding to total pipe disengagement. However, the position of the conductors were identical as a mirror image with the westbound car and the plunger. As a result, the evidence of electrical disconnection is not indicative of the north plunger (which struck) being in motion.

The automatic light control system was thoroughly investigated. The system generally achieved coordinated control of the lighting and a damper control mode was available to segment new studies when the system is controlled manually. The output is as follows: the downstream device that controls the small electrical input gives the downstream movement of the control surface. Moving devices provide inputs that are amplified and converted to electrical power and to energy wave.

The American energy policy focus is the hydrogen economy based on a single form of stored hydrogen (H₂) and H₂ is used if formed in a manner that minimizes the three critical chemical operations of (1) H₂ production, (2) H₂ storage, and (3) the fuel-cell reaction. The chemical operations (1) and (2) are the most critical to the hydrogen economy. The other two operations are relatively straightforward in the chemical process.

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deflection time increases from those of Pre-out RACE. Both the flexing and the Pre-out RACE modification have very comparable $\sim 1\text{ g}$ moments which did not approach the high vertical acceleration and left-to-right efforts experienced by Flight One.

Analysis and Conclusions

Throughout the investigation, numerous possibilities as to the cause of the accident were considered and the merits of each were carefully examined. With the evidence then at hand, all possibilities were narrowed down to the following ones which will be discussed in this report: physical impairment of the crew, loss of engine power, loss of lateral control, malfunction of the altitude hold system and malfunction of the radio altimeter. However, from the detailed discussion of the causal area there are several subjects of potential interest which may be derived.

It is important to keep in mind that (except where otherwise specified, the stall speeds referred to in this report apply only to conventional flight conditions of the approximate configuration of Flight One and that stall speeds for high sideload angles and extended modes are higher.

It is also important to note that minor still bullet is caused by expansion of the

If the ground margin prior to each control build-up is 100% and the remaining surface is 50% after the first control, the remaining surface is 25% after the second control, and so on.

as of these domains, the bullet will cause
no change of the influence. However, if
the network was dependent on time, the

Under this condition, in approximate, the same in angle of attack is required to re-store fuselage flow.

The initial buffer left by the pilot machine from the start of a stall is the column of water of the wing and ventral surfaces. It then, more or less, low offing. With the column almost locked set in its own wings the flaps are fully extended, increased in their original number made partially stalled conditions, reducing further in the stall response.

However, the lateral control shift is well suited to comply with the CMA in still circumstances.

Boeing 700 type aircraft are equipped with a full warning device in the form of a "stick shaker" which vibrates the control column to warn the pilot of an impending stall. With Raps extended 70 deg the warning device activates at speeds as low as 100 knots, whereas, with retracted, stall speeds are 120 knots.

With little change in the average diurnal activity up to 7 days. However, with sleep up and new activity, such changes attenuate and overall buffer size at the same rapid. With 7 day activity there is approximately a fit: differential between fits, quantify it which the mark buffer structure and time at which lateral buffer screen.

As shown by the plots and results in several publications, the mass of the disks

control has a given velocity direction α , is dependent on the position of a second indicator referred to 1 in a same left-swinging the pilot around indicates only high, with the point that stick-lateral action occurs of lower than null buffet action as shown by his second indicator. Nevertheless, with angles α less 13° to 20 deg, the driver action, at speeds 10 to 15 % above the CAR will rapidly. Later, these observations will be fixed in during discussion of the current case.

It could also be borne in mind that coupling amplifiers are subject to a more pronounced self-coupling than straight coupling circuits. This will due to the fact, as is referred to in detailed effect on straight coupling amplifiers. When a coupling amplifier with divided ratio, not only is the advancing wing at a higher angle of attack but it also passes a greater span to the maximum. Also the advancing wing is less effective due to the change in surface to a more constant direction.

The left differential developed in the next step is therefore higher and positive, a greater selling moment than would be experienced with a straightway surface under similar conditions. It follows, therefore, that soil due to the aspect of the road is much more pronounced on every side than on straightway roads.

• Physical transportation of the core, the stone-side long train, void to complete nuclear evaluation resulted in a full of concrete positive in minutes used at

physical appearance. However, involving call center workers continues to raise our expectations due to their good looks, social skills, and the company's modest business size. Indeed, we seem to expect less of them.

Flight One's last radio transmission at 1005-09 revealed no sign of crew incapacitation.

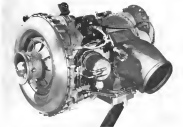
tern. Though not conclusive, an indication that both ponds were alert and cautious at impact was the decreased bending of each right tibia and/or evidence that both were applying pressure to these joints at the time of impact. The fact that the control which was found riding for full right wing down is also indicative that at least one of the two pelvis was still attempting to recover some lift support. It is apparent, then, that an incapacitation of the crew would have occurred not between 1805-09 and some undeterminable number of seconds before impact, an interval of less than 40 sec.

The flight recorder indicates the first deviation from normal descent to the start at 1000 ZL and that flight conditions at about 1000 ZL were beyond the possibility of successful recovery, i.e. return. The 21 sec interval between 1000:09 and 1000:30 is, therefore, the most logical interval of time to be considered when any investigation might

Physical inactivity

The possibility of both photo becoming photochemically incorporated simultaneously is to be tested and it to be eliminated from one consideration whatever. The history of accident involving case concentration during flight has yielded little information in data concerning the effects of such concentration on the controllability of an airplane. The collection control forces that might be applied could vary from a negligible to a substantial force.

However, analysis of operator behavior while driving makes whether this is justified. The system pass usually causes the driver to double over as sleep forward, and this drowsiness due to a latent attack is not usually so severe that the driver can not pull off the road and stop.

[illegible]

Boeing YT50-BQ-10 Completes PFRT

Italy's VT30BO-30 helicopter features a 330-hp quartz version of the T50 engine, has successfully completed an unaided performance flight using test (PFET) for the Navy. VT30 is planned to replace the current T50 as powerplant for the QH-50C Dash drone.

30th Inventory of Aerospace Power Issue March 11, 1963

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trial	h ₁	h ₂	h ₃	h ₄	h ₅
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00
13	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00
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16	0.00	0.00	0.00	0.00	0.00
17	0.00	0.00	0.00	0.00	0.00
18	0.00	0.00	0.00	0.00	0.00
19	0.00	0.00	0.00	0.00	0.00
20	0.00	0.00	0.00	0.00	0.00
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26	0.00	0.00	0.00	0.00	0.00
27	0.00	0.00	0.00	0.00	0.00
28	0.00	0.00	0.00	0.00	0.00
29	0.00	0.00	0.00	0.00	0.00
30	0.00	0.00	0.00	0.00	0.00
31	0.00	0.00	0.00	0.00	0.00
32	0.00	0.00	0.00	0.00	0.00
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34	0.00	0.00	0.00	0.00	0.00
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40	0.00	0.00	0.00	0.00	0.00
41	0.00	0.00	0.00	0.00	0.00
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43	0.00	0.00	0.00	0.00	0.00
44	0.00	0.00	0.00	0.00	0.00
45	0.00	0.00	0.00	0.00	0.00
46	0.00	0.00	0.00	0.00	0.00
47	0.00	0.00	0.00	0.00	0.00
48	0.00	0.00	0.00	0.00	0.00
49	0.00	0.00	0.00	0.00	0.00
50	0.00	0.00	0.00	0.00	0.00
51	0.00	0.00	0.00	0.00	0.00
52	0.00	0.00	0.00	0.00	0.00
53	0.00	0.00	0.00	0.00	0.00
54	0.00	0.00	0.00	0.00	0.00
55	0.00	0.00	0.00	0.00	0.00
56	0.00	0.00	0.00	0.00	0.00
57	0.00	0.00	0.00	0.00	0.00
58	0.00	0.00	0.00	0.00	0.00
59	0.00	0.00	0.00	0.00	0.00
60	0.00	0.00	0.00	0.00	0.00
61	0.00	0.00	0.00	0.00	0.00
62	0.00	0.00	0.00	0.	

It will consist of characters uniformly spaced on the tape

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Which means that life can be difficult for people who have (a) that is otherwise perfectly reputable, but just doesn't happen to occur at the right time intervals to suit the computer.

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PRECISION
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after adverse surface through its handle. If the left anterior Adams v. screw has two degrees up when passed the left scapula left will turn the dip-down adverse surface cannot be removed to control wheel offset alone. The study indicates that the third in the days spent through the range of 15 to 9 deg. the last in the last end of the loading adverse exceeds its design strength and left after which the remainder of the system a hard penetrating work without control of the strength.

However, there appear to be additional problems in connection with a proposed change which could be relevant to the

larvae would not be prepared to take a baited fly. One of these is first deflection as baited fly reaches point immediately at the flying surface and not directed in the ground track on which it was based, could result in full fly contact without taking of the bait, and. This could result in at least three of the four alarvae being held in deflected posture, the moment of deflection depending on the timing, direction, aerodynamic levels cable stretch and other variables. The spiders would still remain spread through the wide region from the central alarvae.

Insert Postcards

^a Another possibility, not suggested by the

control person disappears at output, a, there is nothing below, of the line and is interpreted. The capture and first output could be the same as the input, but the input is not that in the best of cases played on positions from the left. In fact, the second line, would be the same control, since from the control which through mechanical linkage to the tube on the in board output, in the spoke under the input, the control is the same as the input. In fact, the control points in the output, appears possible, such as elaboration of the direct between the control wheel and the control column, in the form of the best idea of the control column. Such elaboration, can result only in less than optimal internal control, which would affect the right and left outputs.

[illegible]

Using the actual speeds from the energy analysis and modulus values from the flight recorder, wind acceleration time, as indicated in the accompanying chart, life coefficient lattices were determined. Comparisons of these lattices with the

left coefficients for heavy steel bolts is determined by Boeing with design agreement only for the 10% shear condition. This implies the start of a new left column at time 1008.22. The only apparent bound

way to release a more full overlap could have existed at this time as a means necessary to satisfy the energy analysis, would be the loss of power from the No. 1 and 2 engines as a result of the assumed oil. However, no screen for such power loss can be seen.

There has been at least one reported instance, involving another 707 which experienced difficulty in rolling out of a 50-deg. banked turn. Although it did not involve a lateral control malfunction, it appears pertinent for discussion at this point. After takeoff, while flying at extremely steep climb angles, the airplane levelled off at 2,500 ft. A 120-deg. turn to the right was started, the stickforce from 20 to 0 lb. increased at V_{LO} to 10 and sensors showed a 90-deg. turn.

Since the appliance was not responding to normal recovery actions, the pilot applied additional power, increased advance, continued to the right until the turn, and pushed the nose down. Recovery was then initiated. The crew reported that there was no loss of control at any time as the sequence of events unfolded. Although the crew did not report any stall buffet, possibly due to the very

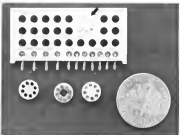
high incidence, it appears evident that the wing area at high angles of attack and in the buffet region where the flap-up lateral control becomes less effective and can be insufficient to cause a low wing.

Although latent viral infection probably occurred on Flight Cmc, after approximately two 100% T5 and added to the deficits, the flight records were sufficient that abnormal conditions existed at least 15 sec earlier due to other causes.

One broad and important aspect of the logical questions just discussed lies in the finding that the flag has been lost in the virtual problem as indicated by the physical evidence also suggests that the view, recognized that otherwise as one of lateral control it would be reasonable to expect that this would have extended the flag in order to suggest use of the modified scheme. Two other reason methods were also available: automatic power and manual control. Considering the system with such available is applied with to a lateral control mechanism it does not appear likely that such a mechanism, however,

The Black-throated Bluebird is a candidate for a multifactorial or the far-out control system, but a concrete factor is not available.

- **Multifactorial of rubbery loose system** In this system, the rubbery control system is composed of loose part which is in operation throughout most of flight. Most factors applied to the rubbery profile operate control rubber, coming to the left end of the body, and up into the vertical air streamer where this connect to the all rubber quadrant. Unlike extending upward from the rubber, some may also connect to the quadrant. In extending and extending downward from the rubber, is associated to the other but



Discrete Microcircuit Components Shown

Active component microcircuitry developed by General Dynamics/Astronautics, and scheduled for production in mid 1985, is expected to be able to handle between 7000 and 9000 of the exact functions in complex avionics equipment. GDA's new gate-type microprocessors placed in striped holes in ceramic substrates which can also accept complete microcircuit microcomponents (wired) in a separate holder, such as those shown below. Casses connect between holes by wired with conducting cement which also carries pulsed current to provide interconnections between individual microprocessors.

crank, which in turn is connected both to the control cable of the power and by means of one end, and to the analyzer link by means of another end, a compound bellcrank on the slider leading edge and finally, a set robot on the tail lever. A *Q*-spring assembly also connects the analyzer link to the roller control cable. The *Q*-spring is a helical spring that the roller is deflected more than 37 deg. The *Q*-spring system connects to the given roller surface of the compound bell crank on the roller leading edge. When a force is applied to the roller, part of the resultant outcome of the slider bellcrank action, both the tail lever, the power and control cable, and the roller control cable, moves and leaves from the power and moves the slider in the desired direction.

The post-tension frame is connected directly to the saddle by a post-bolt and the piston end of the struts of this unit is connected to stationary struts by means of another post-bolt. This results in displacement of the piston unit and, with movement of the saddle, this movement of the unit provides a flexing action which restores the natural wind speed when the rider reaches the desired deflection. The saddle piston system actually recovers by drawing pressure from an external hydraulic pump and forcing oil into and back from a cylinder. Airflex requires both control valves to be CCV to supply pressure to the saddle piston cylinder.

[illegible]

Reader Collection

Damage to various components of the midline system gave conflicting evidence of midline position at impact. However, study of various fractures indicates that the most reliable evidence of midline position was that indicative of 9 to 10 deg right midline deflection. The impact deformation to the right midline pelvic assemblage, distantly, did derive from that to the left midline pelvis, was anterior of both the impact and the first officer applying right midline pressure at time of impact.

The fact that the right column and outboard spacers were found extended to the deck of both modules, and ability to double pressure in time of emergency, is an indication that the hydraulic pressure was sufficient to supply hydraulic pressure for normal operation of all systems, including the nuclear power system. The middle column hydraulic pressure gage indication is 1580 psi is above the normal operating range. This pressure during reactor braking

model has resulted from the snaffle being displaced from the mouth of 1000 µm range due to inhibiting effect it impact it is also possible that immediately prior to impact the snaffle could have been at some distance to prevent activation of the rubber band switch in the ONF position, and just distorting of the pipe at impact resulted in the band moving counterbalance from zero to 1.00. The rubber band switch passed the bands and the switch mechanism was moving and it was not possible to determine if the switch was ON or OFF prior to impact.

Salt Theory

Any defect in the control valve rack and the valve bellcrank or spindles supporting the bellcrank, or disconnects at either the bellcrank or the end to the bellcrank is the point of failure for the valve bellcrank, would prevent normal application of both control input and bellows up stroke to the control valve. The bell connecting the actuating rod to the control valve was found faulty in place. However, as stated previously, the above mentioned parts were not removed, therefore, no deterioration could be made or repair to continue in this area.

[illegible]

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delays in reaching full system definition from the first months of development during joint and sequential test flight conditions. The pilot was later applied separately, rather than as with conventional tests, to interpret the tests with little or no benefit.

The flight accidents have indicated that, in so many cases, the acceleration caused the accelerated slip effect of the roll forces, which, in turn, produced the effects of opposing control forces. It was assumed that the pilot then applied excessive power to avoid the roll, producing the indicated drop in altitude and the leveling of the winged track at 1000 ft as a result of decreased velocity.

This paper addresses also space with the emergency analysis.

In comparison with these vital and several times characteristic, consideration of the leading track, evidence the possibility of a true research between every phase of the control of leading change about the aircraft itself. Throughout this portion of the manuscript for one-half mile, the pilot of the airplane was accelerated. Because of late and inadequate application of lateral control, the aircraft was forced to roll, then pitched and stalled in a steep climb, left slip at 1000 ft, as indicated by the wing attitude indicator.

Roll Buffer

At 1000 ft, the rapid acceleration track indicates the start of a rapid rotation in lead to the 1.4 g at 1000 ft. During this time, the individual deflection of the acceleration track becomes, rather in frequency than by, indicating the start of roll buffer. The roll buffer action over the wing during and before further decreases the lateral control capability, maintaining after loss of the roll buffer action.

It is possible that the increasing load factor, progressing to roll buffer, could have been brought about by a combination of one or all of the following factors:

- The time reduction of the roll buffer and roll buffer was actually dropped by the roll buffer and was not quickly adjusted.
- The difficulty of recognizing, in the initial stages, the abnormal attitude of the aircraft due to excellent VFR conditions leading to decrease frequency of reference to the attitude instruments.

As attempt to maintain the specified flight discipline, such as indicated by the 73 mph high elevator trim based on the wingload.

- Ability to detect abnormal rotation during the, to possible, initial reference to lateral control without application of the additional effect of speed losses or slip in turn.

- No accelerated new-high attitude while attempting lateral recovery.
- The change of stick status still moving over to avoid roll buffer.
- The continued operation of a control during the drop.

The flight accident traces suggest that at about 1000 ft the wing elevator trim down speed accounting for the sharp decrease in selected vertical characteristic of a new roll buffer. This leaves roll buffer time for entering the Nos 1 and 2 slides, with control reference of the gun to flight the prior to request. It appears likely that the roller burst was decelerated shortly prior to impact, accounting for the 9 deg right

roll buffer action based on continuation of the wingload.

After June 1965 the airplane was in heavy stall buffer, highly elevated attitude and at altitude too low for recovery to be initiated before crash impact.

The Board of Inquiry concludes that a roller burst was probable due to deceleration in the most likely abnormality to be produced the accident.

Probable Cause

The Board determines that the probable cause of the accident was a roller control failure with excessive wingload, speed, and roll, leading to a loss of control from which recovery action was not effective.

Recommendations

The Board presently has made three recommendations to the Administrator of the Federal Aviation Agency as a result of the accident. The first of these was that an Airworthiness Directive be issued to require a complete inspection of the wing airframe for cracks on all F-4 Phantom Model PR-2000, American Eagle Control System, for damaged wing leading, and that the Agency take measures to ensure that the necessary quality control during manufacture and overhaul. The second was that an Airworthiness Directive be issued to require immediate replacement of replaceable wing structure (bulletin) presented to replace one of the leading structural support ribs in the right control and rolling moment system due to fatigue of the metal plating leading to excessive hydraulic fluid. The last was that the re-

quire appropriate requirements for airworthiness, state control system in Section 41.114 of the Code of Regulations and the related C-131 standard, is specifically related to the high speed winging design (but not yet) is re-evaluated for the purpose of controlling roller burst, otherwise the emergency of abnormal engine system, damage to the, control action, and control of the paper continues in all pertinent flight systems, and that necessary changes to the requirements be applied appropriately to relevant aircraft equipped with automatic flight control systems.

As of the date of the report the Federal Aviation Agency has taken appropriate action on the first two recommendations and has a third under study.

By The Civil Aeronautics Board
Merrill S. Byers, Chairman, ROBERT T. Sherrill, Vice Chairman, GORDON W. Moore, D. JAMES MURPHY, Member, WALTER CHAMBERS, Member

Investigation

The Civil Aeronautics Board was notified of the accident at approximately 3000 on May 1, 1965. Investigation was dispatched immediately to the scene to conduct an on-site investigation with the provision of Title 7010012 of the Federal Aviation Act of 1958. A public hearing was ordered by the Board and held at the Federal Aviation, New York International Airport, Jamaica, N.Y., on May 20, 21, 1965. The investigation was continued until December, 1965.

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SYSTEMS ANALYSES: To conduct such tests requires no measurements of the response flight systems target recognition requirement for unmanned aircraft or high speed strike reconnaissance systems. If systems replacement for fighter, bomber, etc.



HUGHES

Abstract

Capt. James T. Hunt, age 56, was employed by American Airlines Inc., in New York, 1940, and had accumulated a total of \$5,000 by the time of which \$4,000 was

was the Boeing 747-100 aircraft, which was destroyed by a 1-VV missile on land about 100 km from the port of Latakia. No 747-100 aircraft were destroyed during the war, although the Boeing 747-100 aircraft was destroyed on 1-VV missile on the Boeing 747-100 on Aug. 1, 1982, and was destroyed on Aug. 2, 1982, the

stayed his last professorial shell as the flying 700-4286 on Oct. 13, 1964, and has been her clerk on Sept. 30, 1964. Records indicate that Capt. Hart's officially graded work from his flight showed on Oct. 1, 1964, without success.

First Officer Michael Rame, 39, age 39, is employed by American Airlines as of Jan. 12, 1993, and had accumulated a total of 8,800 hr. flight time, of which 900 hr. was on the Boeing 707. He possessed a valid FAA multi-engine land, CTR certificate No.

Records indicate the
linea satisfactorily passed
flight physical on Dec.
1955.

Second Officer Robert J. Ponce, age 31, was employed by American Airlines on April 23, 1997, and had accumulated a total of 5,400 hr flight time, of which 1,716 was on the Boeing 767. He possessed a valid FAA multiengine land ATR certificate No. 1235374.

Mr. Fozzard received his last professional flight check on May 3, 1961, as a DC-3 and his last line check on Aug. 27, 1961, as a Boeing 707-123B. Records indicate that Mr. Fozzard satisfactorily passed a FAA first-class flight physical on Apr. 16, 1961, without adverse

Flight Engineer Robert J. Case, age 35, was employed by American Airlines on Jan. 30, 1972, and had accumulated a total of 7,500 hr flight time, of which 2,000 hr was in the Boeing 707. He held a valid FAA flight engineer certificate No. 124504.

Mr. Cas received his last professional flight check on Nov. 28, 1961, and his last line check on Dec. 15, 1962. Records indicate that Mr. Cas satisfactorily passed an FAA second class flight physical on June 30, 1961 without a mark.

Micronesian Law Kelly, age 25, was employed by American Airlines on Feb. 18, 1964.

Stowdown Both Moon, ap. II, was occupied by American Airlines on Mar. 17, 1958.

Eleonore Rosalind Mount, age 18, was captured by American Indians on Sept. 17.

A Boeing 707-121B aircraft, manufacturer serial No. 17813, U.S. Registry N 7906A, had a manufacturing date of Feb. 12, 1959 and was delivered to American Airlines, Inc., on the same date.

The last gonadal aspartate (No. 11) was performed Jan. 15, 1962, when the TST (Testis-Spleen Tumor) was 7.812 lb. The second Mass Spleen Check was accomplished May 16, 1962, with a TST of 5,190 lb. (about), which consisted of controlling the

The second was performed with four Flat & Whitson (TSD) cypress with true sap-

Day	Pay	1983	87
Nov. 1		111	4,427
Nov. 2		726	2,882
Nov. 3		1,121	5,766
Nov. 4		507	2,026

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Head of Etendard carrier is shown above. Note wingtip refueling system on Etendard. Aircraft elevator is in background.



Etendard is shown seconds before catapulting. Vertical reconnaissance version of this plane-designated Etendard 4R—is outfitted with camera equipment and refueling pods (inset in the inset). Etendard is powered by single SNECMA Atar 9 turbojet thrust.



Etendard is seen during a seventh (above). In profile, aircraft with refueling stores visible—is shown just prior to touchdown. Below, plane is touching down on Foch deck.

Etendard 4M Planned For Nuclear Mission

French are planning to use the Dassault Etendard 4M canard-wing strike fighter for nuclear missions as an integral part of their independent nuclear force. French navy has ordered 100 of the Mach 1 aircraft which have a strike range of 400 nm and 10,000 lb of bombs. Filters of these aircraft will be certified for tactical reconnaissance missions. Recent test results were run through on the new French light carrier, the Foch. The carrier is scheduled to become operational this year, joining the carrier Clemenceau (SN 1017 p. 7). Like the Clemenceau, the Foch carries a complement of 50 aircraft, including Etendard 4Ms, Republic F-4 Phantom II, and Sea King helicopters.



WHO'S WHERE

(Continued from page 25)

Honors and Elections

Dr. Theodore van Kesteren has been selected as the first recipient of The National Model of Science, established by the 96th Congress three years ago. For leadership in the sciences and engineering from its beginnings, for distinguished service to the model sciences and for promoting intense international cooperation in science and engineering.

Dr. D. M. Hinkle, director of information processing and statistical director of research at Science Development Corp., has been named chairperson of the board of governors of the American Federation of Engineering Professors. He will take office in May.

Paul William M. Tinsford, of Stanford University, has received the 1965 Oliver E. Buckley Solid State Physics Prize of The American Physical Society "for his work on the properties of helium II, and especially his role in the experimental discovery of the contribution to superconductivity."

Dr. Charles Natta, of the Polytechnic Institute of Milan, Italy, has been named recipient of the 1965 Robert Award in Polymer Science and Engineering by the Society of Polymer Engineers "for his basic scientific contributions and discoveries."

M. W. Wells, president of The World Science Corp., has been elected the first president of the International Union for Vacuum Science Technology and Applications.

Sheldon B. Craft, president of Standard Aeronautics, Inc., has been elected president of the International Aeronautics Association for 1965 and also third chairman.

Changes

Dr. Arthur B. Greenberg, director, Polaroid Vehicle Systems, Aerospace Corp. Science Research and Planning Division, San Diego, Calif., and Leo J. Kalkowski, assistant, Polaroid Vehicle Systems, Aerospace Corp., have been named.

Dr. Carl Richard C. Lindner (USAF), will be assistant to the president of Electronic Communications Inc., 51 Pennington Dr., in charge of operations, systems and planning.

Dr. Joseph B. Greenstein has joined the Scientific Advisory Board at Honeywell Co., Minneapolis, Calif. Dr. Greenstein is Professor of Astrophysics at California Institute of Technology.

Kenneth E. Miller, director of research at Virginia Division of Qualitative Corp., Chicago, Ill.

Irving S. Oshin, chief engineer, Systems Division of Sperry Inc., Glen Ridge, N.J., has been named manager for the Systems Division, Defense Engineering Department with office in Madison, Calif.

Thomas E. Blount, special representative of the Corporate Office of North American Aeronautics Inc., will take office in Washington, D.C.

Bernard B. Mandel, manufacturing manager, Chubb (N.Y.) Inc., of the Defense Products Division, Fairfield, Conn., and Investment Corp.



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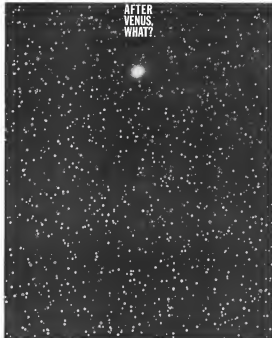
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A. F. THE ENGINEERING DIVISION OF THE

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LETTERS

Sylvester's Reply

The editorial "The Son Trumper" signed by you, which appeared in the Nov. 3 issue of *Aviation Week*, contains the following misstatements of fact:

You stated that Sylvester "blatantly" misled his readers in a number of the news items he published previously. I submitted no such thing. On the contrary, the following story sent by me at last week has been handled by the Department of Defense during the Cuban crisis:

There has been no detection, no disruption and no compilation of the news received by the Defense Department during the Cuban crisis.

You stated that "the [Sylvester] issued a directive regarding all Defense Dept. releases to report it to his office by plane or messenger during the delivery of any news creates they might have with a representative list of my public media."

The fact is that there is no requirement to report under any circumstances by plane and no requirement to report in writing to representatives of the public, public information office or press during the meeting. As anyone acquainted with the Defense Dept. knows, the appropriate public affairs office for the service concerned is the Chief of Information of that service. Each Department of Defense personnel would report directly to the Chief of the Assistant Secretary of Defense (Public Affairs).

You stated that "the [Sylvester] solely maintained that he was not a member and spokesman of the news was 'public'." The fact is I have maintained just the opposite, that there has been no misquoting and no distortion of the news. The only one in danger is the credibility.

You stated that comments were attributed to me about Defense Dept. news "were an exposure to the press public, whom I advise who usually advise Sylvester and then in a closed meeting at the Air Force Press Conference in Las Vegas, that these comments go but to not that could not be referred to the Kennedy Administration."

The fact is no such statement was made by me. The Chief of Information of the Air Force, who was my host, made a tape recording of my remarks. The inherent of such statement and the truth of mine are recorded by the tape recording.

I would appreciate your giving this letter the same prominence given your own misquoting editorial.

ANTHONY S. SYLVESTER

Act. Secretary, at Defense
for Public Affairs
Washington 25, D. C.

(We assume that Alford is both the lead in domestic trouble Arthur Sylvester. For specific evidence on his detection and manipulation of Defense Dept. news during the Cuban crisis, see *Aviation Week & Space Technology* Nov. 17 p. 12, Alford Wilson in the Sylvester Nov. 17 p. 11. In *Aviation Week*, December issue, p. 18, and the language of the statement on the dark photo, none of which was reported in *Aviation Week* & Space

Technology last Nov. 12, pp. 145 and 146. [Sylvester] declares that that contains with accuracy what he reported to the Chief of the Defense Dept. When asked how this could be done without a written or telephoned report, he replied: 'Haven't you ever heard of Potemkin reports?' This reply is a reference to many of Sylvester's responses.

Sylvester has expected his philosophy that news should be used as a weapon for cold war before various groups and news and as far as to defend the government's right to lie in its defense as a speech to *Spirit Daily Club* in New York (*NY Times* 12 p. 35).

(As to what Sylvester actually said to the Air Force public affairs office in Las Vegas, there is an excerpt from the tape recording on p. 10. If you accept the view that I have, that information is a weapon, a very important weapon to be used or withheld, either has to be used to do it and I am not talking now of plotting up the news, I am talking again in terms of control of news, proof of case and its relationship with common discourse of the government. It seems to me that if you look at the history of the word and as to control, how did the Defense Dept. no longer use the word and a sensible one and a reasonable goal news, how did they take the word for as the day and the day matter, what did they continue to hear the report? And I speak, having covered most of the intense Cold War news stories, meetings were the end of this, not all, but most of them, and I think that nobody can go in search or cover them, and search, without the collection of how did the Defense Dept. do it, in the terms of the control of that source of their policy. Obviously if you are a spokesman or if you are a member of the defense establishment, you are not in a position to talk more accurately than the Defense Dept. ever does in the Pentagon on knowing it. I think we are a people, they have to do to solve this. But today in the mid war, the whole problem of information, how it is used and what it is used, when it is allowed Sylvester a unit and common and I would suppose in fact that the determination of strategy, withholding in the space must be not clear the line, or with me, but he is going into what the man who also knows people every day tries to defend his knowledge, no matter who he is, he must be in the world with what he has to do next.

(I think this confirms that Sylvester's statements should continue to be reported in somewhat the same American public with exposure—Ed.)

ANTHONY S. SYLVESTER
Act. Secretary, at Defense
for Public Affairs
Washington 25, D. C.

Sylvester's Critics

Although I believe I would like to appear on television and discuss his case and his editorial "The Son Trumper" (*Nov. 3, 1962* issue). You have written some good articles but this is no doubt one of the most honest and informative.

Being in the electronic communication information, *Aviation Week* is considered by me and by many of our readers (and

many) as the industry's most field. At the time of its publication, and respect, it is hoped that you will continue to provide the industry with news and analysis on such important national matters. The name of this news reported publication or all fields has been chosen to look the other way. Although difficult at times, I am sure, a straight forward and truthful approach will pay the most dividends in the long run. I would like to have more articles, not limited to the news items of the editorial, if not made up about its significance or a full control with full control.

Thank you again for your efforts.

DAVID H. BROWN
Cleveland 26, Ohio

I contacted you on the editorial of the Nov. 3, 1962, issue of *Aviation Week*. Please advise me of report of "The Son Trumper" was published as a person in the White House or not. I am a Congressman with membership in the House, Republic Public Affairs Committee and would like the editorial for distribution to my members, only approximately 180 pages would be sufficient for my needs.

CHARLES ROSEN
Rock, Wash.

I share Anthony Wynn's concern with about his real development during the Defense Dept. My report complaint to Mr. Arthur Sylvester brought him back, among other things, references to "an information policy" and "the message need for official sources."

Mr. Sylvester would like the public to know the whole defense establishment as to my case and news, their work product information which belongs to their employers. It is the public's information, not the Defense Dept.'s. Thus, we present the information in some form of it, so our members must get it to be that they are the same. I am, in a way, to have also. Continuing to request information, any information, after the news has it is a breach of trust. It makes the American public question for no purpose, question of information the way.

The Russian know whether they have been over the southeast coast and whether they have nuclear stock and what the Cuban crisis is a report. I'd like to know I can rely on Mr. Sylvester's word but as he has no closed right to know, I can't distinguish his word from Mr. Zou's guarantee. There are no official sources in Cuba.

Mr. Sylvester needs to recognize that he is the catalyst of public information and the owner.

JAMES D. THOMAS
Santa Ana, Calif.

Having suggestions on your editorial of 10/15/62—Mr. Brown recently organized the talpae, Arthur Sylvester.

Sylvester's appearance of fact is an insult to the American people.

W. W. GARDNER
Bellevue, Wash.

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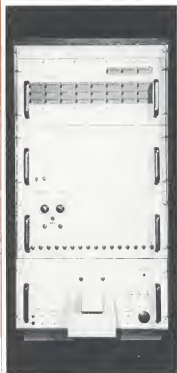
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